AMERICAN MACHINIST

A JOURNAL FOR MACHINISTS, ENGINEERS, FOUNDERS, BOILER MAKERS, PATTERN MAKERS AND BLACKSMITHS.

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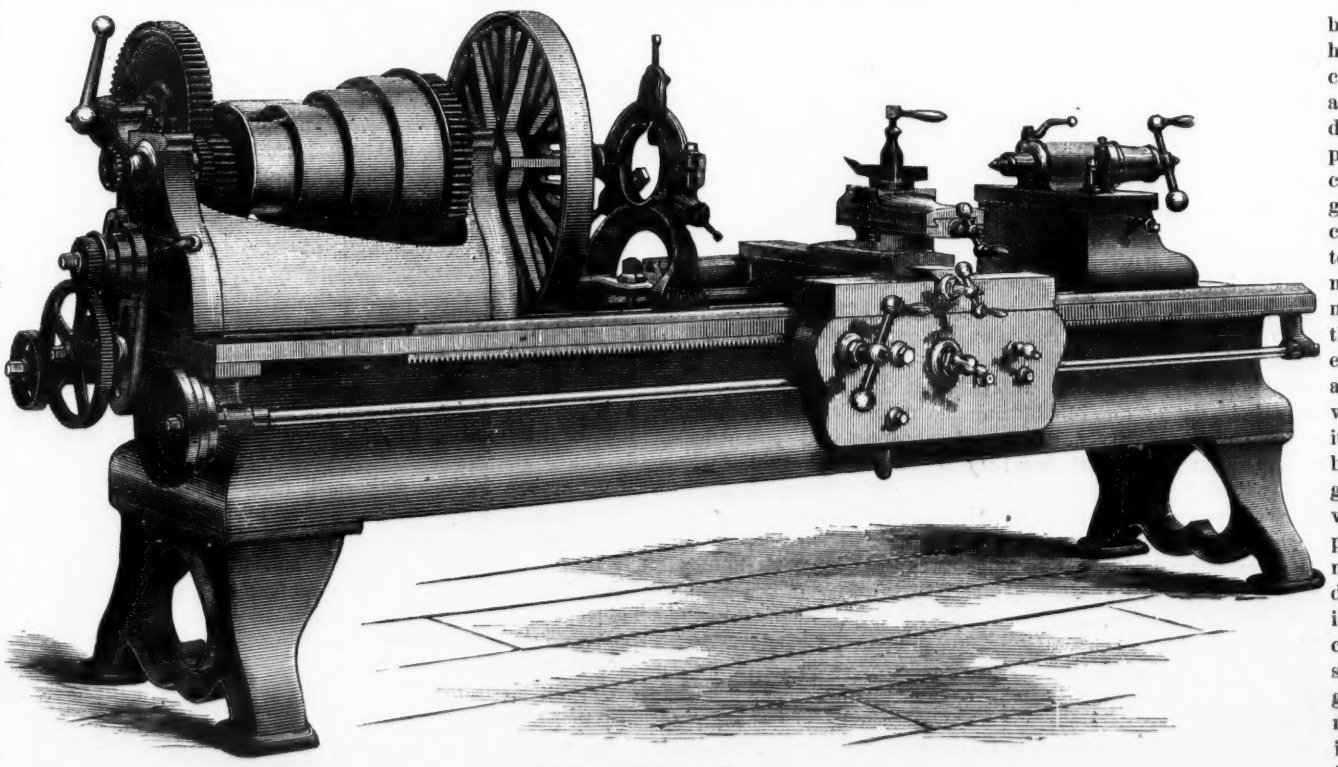
New Engine Lathe.

The illustration herewith represents an engine lathe of either 24 or 28-inch swing, built by Geo. W. Fifield, Lowell, Mass., from a new set of patterns, which possesses special features of merit. The head and tail spindles are of forged cast steel as well as several other parts that require great strength and are exposed to wear. The bearings are large and heavy, and, unless otherwise ordered, are made from hard cast-iron from a grade of pig selected for the purpose. If desired, either deoxidized bronze, phosphor-bronze gun metal, bell metal or composition bearings are used. The heads are strongly geared, and the gearing is still running. The cones have broad faces, and the carriage is gib bed firmly to the bed, and, when desired, is fitted with compound rest to move in any horizontal direction; also has power cross-head feed that will square up full swing of lathe. The feed is rack and friction, and is claimed to be unusually strong and durable, and entirely independent of the screw. The screw is fitted with open and shut nut. The racks are steel as well as the pinion gear, meshing into same.

Each lathe is furnished with a countershaft with patent friction pulleys, which are both durable and noiseless. They are thrown in and out of gear with ease. Every lathe is furnished with large and small face plates, center rest, wrenches, and the like.

Mr. Fifield builds all sizes of engine lathes from 16 to 48 inches swing, and of any desired length. His specialty is lathes which are built in lots, thus enabling the price to be fixed as low as possible under any system. The lathes are strong, heavy and durable, without being clumsy, and each part moves quickly and easily when in operation.

Mr. F. has spent some years in collecting the most valuable ideas in improvements in lathes made by others, and, after adding many of his own, feels much confidence in the tools produced as the result of his study and experience. It is claimed that the very best material and workmanship is employed. Photographs and full particulars will be furnished upon application to the manufacturer at the above address.

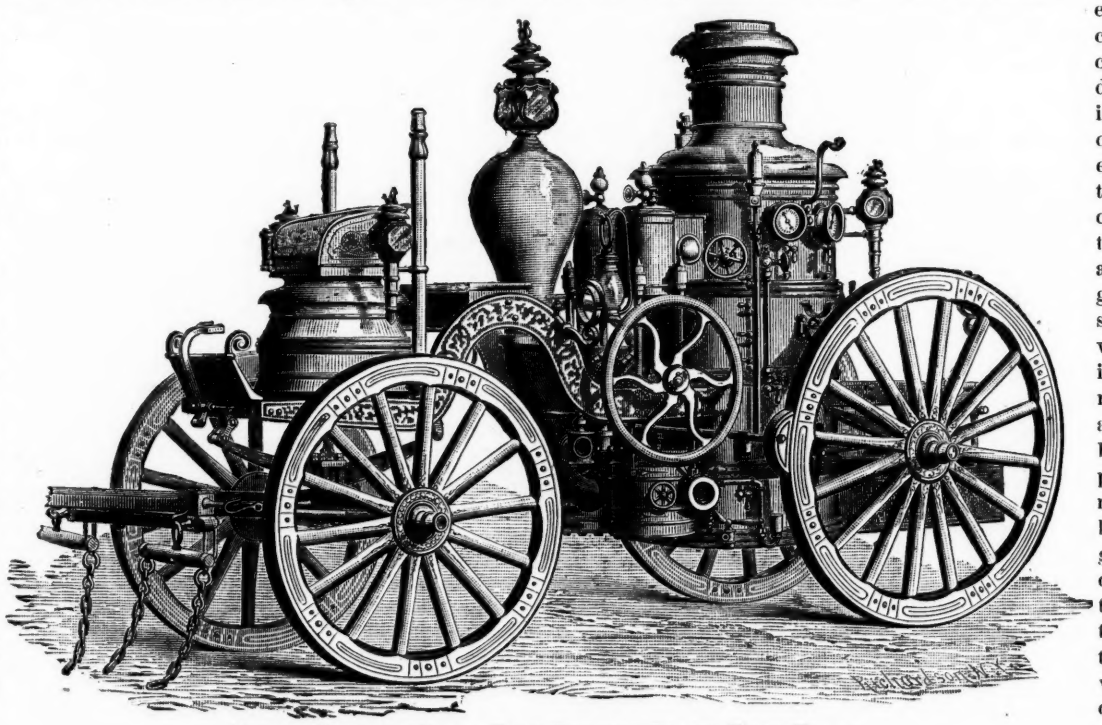


FIFIELD'S ENGINE LATHE.

As business improves, strikes become more frequent. Mechanics should learn two or three trades, so that when on a strike in one business, they can obtain work in another. We commend this plan to trade unionists.

Improved Steam Fire Engines.

Our illustration represents the first and second class double-plunger, crane-neck frame Amoskeag Steam Fire Engine, and embodies all the latest improvements. There are several styles of these engines, from which may be selected a machine adapted to meet the wants of any particular locality. The crane-neck frame is the style adopted as a standard, and all engines are built after this style unless otherwise desired. A self-propelling apparatus is applied to these engines when necessary, thereby avoiding the use of horses. In many respects this propelling power is far superior to horses, particularly where the ground is nearly level, although there is sufficient power to climb quite steep hills. The same engines are used as for driving the pump, and are furnished with a reversing gear, so that the machine may be propelled backwards or forwards, as desired. This arrangement adds but little to the weight of the machine, and does not interfere with the ordinary drawing attachments for either horses or men. The steering apparatus is simple and effective, and very little exertion is required on the part of the driver to keep the machine in line, even when running at the rate of sixteen miles per hour. The general style of the first and second-class double-plunger engines are the same, and the only difference between the two classes consists in the dimensions of the parts. The engines are hung upon elliptic springs, both forward and rear, and ride with remarkable ease and steadiness. Each size has two double-acting plunger pumps, lined with brass, with rubber valves and brass valve seats, and two steam cylinders working upon the same piston rods with the pumps. In narrow and crowded streets and passage-ways, the engine built with the crane-neck frame possesses some advantages over the straight frame engine, as it can be turned in less space, and handled in such localities with greater ease and facility, but in every particular, except the shape of the frame, the crane-neck and straight-frame engines of the same class are precisely alike. In some cases both classes have been arranged to be drawn by hand, but the horse rig is generally preferred for engines of the first and second class. These engines are built by the Manchester Locomotive Works, and it is claimed of the very best material that can be obtained. The parts are made to conform to standard gauges. In the course of time some of the parts will necessarily wear out and require renewing, as is the case with all other classes of machinery. When this occurs, any part can be furnished that may be desired, at short notice, as duplicates of the parts which are most likely to be needed, are usually kept on hand. These engines are generally sent out in charge of a competent engineer, whose duty is to put the machine together, and test it to the entire satisfaction of the purchasers. A rigid supervision has been exercised in the construction of these steamers to determine exactly the best proportions necessary to obtain the maximum of efficiency to the minimum of weight, and many experiments have been made to ascertain if any improvement was possible in the design or arrangement of the several parts—in the character of the material used, and in the construction of a boiler, steam connections, and pumps best adapted to the purposes of a steam fire engine.



DOUBLE PLUNGER STEAM FIRE ENGINE—CRANE, NECK FRAME.

The very large number of engines which have been built by this company has afforded ample opportunity for determining these points, and the builders claim that their engines, as they are now constructed, are fitted to fulfill every legitimate requirement that may be placed upon them. They are claimed to be capable of hard and long continued work, with small liability to accident. The boilers of these engines are covered with wood, Russia-iron, princes metal, or German silver, as may be desired; but the working parts of the machine are precisely the same, whether the engine is highly ornamented or plainly finished, care being taken in every instance to

secure excellence of workmanship. The difference in price, delivered in the same locality, is wholly occasioned by a difference in the degree of ornamentation. The term class is used with reference to size, and not materials or workmanship.

The sectional area of the pumps (other parts being made to correspond therewith) determines their classification. Builders have usually classified their engines arbitrarily to suit their convenience, but common usage now seems to have settled that an engine having water-pistons, with sectional areas between 30 and 36 square inches should be rated as first-class, those having water-pistons with sectional areas between 20 and 30 square inches should be rated as second-class, and those having water-pistons with sectional areas between 12 and 20 square inches should be rated as third-class. It will be perceived that this classification affords a large margin for difference of size between engines rated as of the same class. The standard engines built by this Company have sectional areas of water-pistons as follows:

First-class,	about	32	square	inches.
Second "	"	28	"	"
Third "	"	16	"	"
Fourth "	"	14	"	"

1. In laying fuel in the fire-box, first lay plenty of shavings, then light, dry kindling wood, filling the furnace full, which in most cases will give steam enough by the time the engine arrives at a fire to commence work, provided the fire is lighted when leaving the house, which, as a general rule, is advisable.

2. If coal is used, be careful to keep a thin fire, and not clog it. Use the coal in as large lumps as possible, and do not break it up unnecessarily in the furnace. The best coal for this purpose is a clean Cannel, in lumps, free from dirt and dust.

3. Be careful not to let so much fire collect under the engine as to burn the wheels. When working for a long time at fires there is some danger of doing so.

4. The Amoskeag boiler is an upright, tubular boiler, with a submerged smoke-box and fire-box surrounded with water. When the engine is running, the water in the boiler should be carried so as to stand at the third gauge-cock, which is placed near the top of the tubes, and it should never be carried below the center of the tubes, at which point the first gauge-cock is located.

5. Avoid using an unnecessary amount of steam. The tendency is to use more than is required. From sixty to eighty pounds is as much as will generally be required to do good fire duty.

6. The engine has two suitable feed-pumps for supplying the boiler with water. One of these pumps should be worked nearly all the time, in order to keep the water in the boiler at the proper height, and to preserve an even pressure of steam.

7. If brackish water is used for supplying the boiler, or if the boiler becomes foul from long use without being blown off, it is likely to foam or prime. If foaming occurs while the engine is working at a fire, it may be prevented or diminished by opening the surface blow-off cock, which is located between the third and fourth gauge-cocks, and blowing off from the surface of the water the scum and oily matter which usually causes foaming. In this way the difficulty can be generally prevented without any serious interruption in the working of the engine. While doing this the water in the boiler should be carried as high as the surface blow-off cock. After the engine is returned to the house, the water should be blown entirely out of the boiler through the blow-off cock near the bottom of the boiler, with a steam pressure of about twenty pounds, and the boiler refilled with fresh water. This process may be repeated until the boiler becomes clean.

8. The pump upon the Amoskeag engine is a vertical double-acting pump, with the cylinder surrounded by a circular chamber, divided vertically outside the cylinder, so as to answer both for the suction and discharge chambers of the pump. It has a separate valve-plate at the top and bottom of the pump, carrying both the suction and discharge valves, the suction-valve upon one side of the plate, and the discharge-valve upon the other. Each of these valve-plates can be reached by taking off the top and bottom of the pump, which is so constructed as to be readily removed. The discharge and suction parts of the water-chamber surrounding the cylinder are connected by a valve in the vertical partition, which is called a relief-valve.

9. With a single long line of hose, it may be necessary to open the relief-valve a little, but at all other times be particular to have it closed, except when desired to feed the boiler without forcing any water through the hose.

10. In the smoke-pipe, directly over the upper flue-sheet, a valve is placed, which is called the variable exhaust valve. By operating this valve, the size of the aperture for the escape of the steam from the steam-cylinder is increased or diminished, thus regulating the draft of the chimney and the heat of the fire. This valve should be closed when the engine is started, until a fair working pressure of steam is obtained, after which it may be opened.

11. Care should be taken to have the suction-hose and its connections air-tight.

12. Open the discharge-gate and cylinder drain-cock before starting the engine.

13. Don't let the flues of the boiler get filled up.

14. Be particular to take the engine off the springs before you work it, and to place it on the springs again when done working.

15. With a long line of hose on, be particular to open the throttle gradually. If it is opened too suddenly, it is liable to burst the hose.

16. The pumps of the engine should be examined at least once in six months, to see that the valves and all the parts are in good condition. The pump-valves should have a lift of about three-eights of an inch, and the suction valves the same lift.

17. The inside of the steam-cylinders and the steam-valves should be oiled or tallowed always after the engine has worked at a fire, and as often as may be necessary to keep them well lubricated; and all the parts of the engine, where liable to friction, should be kept well oiled. Be particular to use an abundance of oil on the "link-block," where there is more friction than in any other part.

18. The running-gear, and every part of the engine liable to disarrangement or accident, should be thoroughly examined every time after the engine has been out of the house, whether it has been worked at a fire or not.

19. Whenever the engine is repaired the engineer should try to help do it himself, as, by so doing, he gets a familiarity with it that he can in no other way obtain.

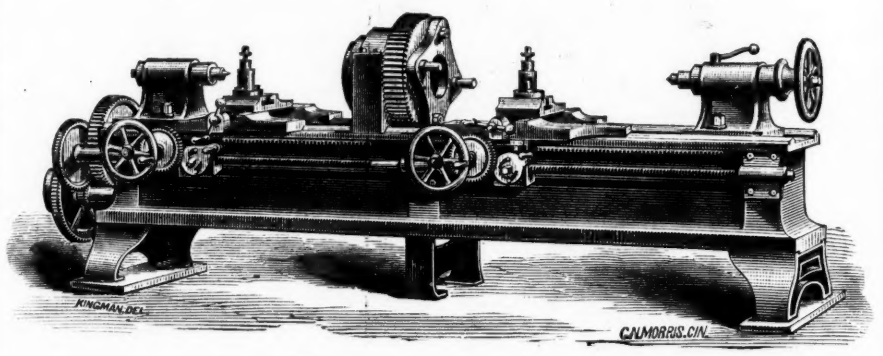
If we ask for locks, gas standards, roller blind fittings, small brackets, hooks and hat pegs, domestic apparatus and tools, substantial toys, and very many other things, we are shown American productions. In the case of many things the preference is not superficial. Hardly any English small castings are anything like so fine in surface, light in pattern, and cleanly turned out as are these American things. Small English castings often show the joint in the mould in which they are cast; and they are either turned out uncoated, or daubed with a common black, or dipped into a commoner. Generally the screw holes are either too large or too small. In all these things the Americans are ahead of us.—*Engineer* (Eng.)

Superintendent of State Prisons L. D. Pilsbury has sent out circulars asking the views of leading representatives of the several interests affected, what substitute can be adopted, either in whole or in part, for the contract system now in vogue in the prisons.

The protectionist sentiment, which has just won such a signal victory in Germany, is also rapidly gaining ground in France. Within a short time there have been held in Paris two meetings of delegates from the chambers of commerce, which are established in all the important trade centers of that country. To the convention of those representing free trade, 18 chambers sent delegates. To the one representing protection, 58 chambers sent delegates.—*Boston Commercial Bulletin.*

The price of old rails appears to be fast reaching the point when pig-iron is quite as cheap for manufacturing purposes. This will be good news for the iron industries, and for all the great interests which depend upon them, as it must denote either an increasing scarcity of the old, or an increasing demand for the new rails. It is thought, however, that the price of old rails cannot go much higher, on account of the importations which are liable to follow the increased price.

A busy man at Columbus, Ohio, keeps a phonograph ready for use in his office, and, when anybody begins to tell him a long story, he says, "Just talk it into the instrument, and I'll listen to it by and by."



Double Car Axle Lathe.

Double Car Axle Lathes.

There is a point in production where simple construction ceases and manufacture begins. That point is, or should be, located where the quantity of a uniform product would indicate a commercial advantage in the use of special productive devices possessing narrow scope of utility and broad economical capacity, as distinguished from general productive devices of great range of utility and but narrow economical features. The permanent investment of capital in special machinery must be justified by a compensating gain upon a permanent product. Before the proper point in quantity of product is reached investment in special machinery is injudicious, and after that point is reached, the absence of special machinery is injudicious.

Railway car axles are required in such vast numbers, that they may unhesitatingly be considered an article of manufacture, and the question of investment in special machines for their production is simply a question of relative saving in cost of product, considered in connection with the interest on increased investment. First cost of economical facilities does not enter into the question.

A common 18 inch lathe will turn car axles perfectly, but two axles would be a good day's work.

The cuts and feeds will be light, and if the power is sufficient for a heavier cut, the machine will be found to spring and destroy the accuracy of the work. Assuming $1.50 to be the cost of skilled labor per day on this work, this would bring the cost of axle turning labor to 75 cents each.

The modern axle lathe is simply a stiff and powerful lathe with unnecessary parts omitted. They will turn 15 axles per day, which reduces the cost of axle-turning labor from 75 cents to 10 cents, and on the basis of 75 cents effects a saving of nearly three thousand dollars per year. This would, if warranted by the demand for axles, justify the expenditure of *twenty thousand dollars for a special axle lathe.* Such figures look surprising, but similar results are often met with in connection with special machinery.

The machine which we illustrate herewith is the double car axle lathe, manufactured under Gray's patents, by the Niles Tool Works, of Hamilton, Ohio. Many of these lathes have been sold by that establishment to railroads and to car companies, and have been found, not only to reduce the cost of axle turning to a minimum, but to produce the highest possible grade of work. The machine is of great power and stiffness and adapted to the heaviest work. The torsion of the axle under cut is reduced one-half by reason of the driver being at the center of the axle's length, instead of at one end. Both centers are dead centers, and the journals are thus turned true with each other, while, as is well known, by the old plan of turning the axle end for end, after one journal was finished, the journals would often run perceptibly out of truth with each other.

Two tool rests are used, and both ends of the axle being turned at once, a marked increase in capacity is natural.

The change from roughing to finishing feed is effected by a single movement of a knob. Aside from the saving in time effected by turning both ends at once, a considerable saving is made in the handling of the axles. They are put between the centers once, and come out finished. One-third of the time spent in handling axles is generally spent in turning them end for end, something not required to be done on this lathe. The capacity is one-third greater than on the most efficient single-ended lathes. The Niles Tool Works construct these lathes especially for narrow, standard, and broad gauge works.

The building trades are particularly active in Chicago, Baltimore and Philadelphia. In St. Louis the activity in building operations continues unabated, the aggregate value for one week being about $150,000. The advance in wages is sustained, and good draughtsmen find positions readily at their own prices.

The new tariff closes Germany to the great industries of Russia, Austria and England, and will make the German States, as the Chancellor believes, look hereafter to each other for the supply of such wants as heretofore have been satisfied from foreign sources.

Boiler and Cylinder Pressure.

Mr. Editor:

Chancing to look at the circular of a well-known firm of steam engine builders, one of the prominent points noticed was the claim of "admitting steam to the cylinder at boiler pressure." Of course, a moment's thought will satisfy any one that, literally, this result cannot obtain, but it is not always so easy to account for the discrepancy occasionally found in practice. A few years since the writer was called upon to indicate a slide-valve engine, which had been fitted with an automatic expansion valve of the "gridiron" type, working on the back of the main slide. The bore of cylinder was 22″, the engine working at the slow piston speed of 280 feet. The initial pressure was full 10 lbs. below boiler pressure, the gauge and indicator spring agreeing perfectly. Looking at the steam pipe it was found to be small for so large a cylinder, 4″ in diameter, and about 25 feet long, with four right angle bends. Considering the slow piston speed it seemed doubtful, however, if the size of the pipe was altogether to blame. An analysis of the valve motion showed better than the pipe. With a view to locating the difficulty the oil cup was removed from the steam chest, and the indicator applied. The accompanying diagrams were then taken respectively from the cylinder, Fig. 1, and steam chest, Fig. 2. In both instances the boiler pressure, as measured by the indicator, was 79 lbs. The scale is

1″=40 lbs. It will be noticed that the pressure in steam chest fell—in one instance, 6 lbs. and in the other 10 lbs.—immediately upon the opening of the main slide at the commencement, or even before the commencement of the piston stroke. We might rashly conclude all this was owing to an insufficient area of steam pipe, but we are met by the fact that up to this time the total area of opening of main slide does not exceed 2″, while the constant area of steam pipe is nearly 13″. The amount of steam used up to this time is only that required to fill the waste space from piston to valve face (which was large)+that condensed in heating the exposed surfaces to the temperature of the entering steam. In this connection it may be noted that the fall of pressure is 4 lbs. more at the admission to that end of the cylinder where compression was the least. Although this is partly due to lower pressure existing in that end of cylinder at the opening of the valve, it is also undoubtedly largely due to its being so much cooler from insufficient compression to heat it, this lack of heat having to be supplied by the entering steam. Another noticeable feature of the diagram from the steam chest is the rise of pressure, after the cut-off valve has closed, to a point materially higher than that existing in the boiler; and here it will be noticed, this excess of pressure was greatest during the stroke from that end of the cylinder at the commencement of which it fell the lowest, as also that it rose more rapidly at that end. The conclusion would seem to be that the column of steam extending from the steam chest to the boiler required an appreciable *time* to put itself in motion, but once having acquired motion it was more than sufficient for the supply, in the one instance increasing the pressure to fully that in the boiler before the point of cut-off. Again, having acquired momentum it could not be stopped without the exercise of considerable force, as shown by the excess of pressure in the chest. As might be expected the pressure rose much more rapidly from the end where it fell the lowest, and having for this reason more momentum, required the exercise of more force to arrest it—in other words, the pressure rose higher before the flow ceased. Had the loss of pressure been more gradual and increased till the point of cut-off, the conclusion would have been irresistible that the steam pipe was too small. As it is, however, it is believed to have been owing to the time required to effect a *change of motion* of the steam at the abrupt turns in the steam pipe, three of which were in the immediate vicinity of the cylinder.

F. F. HEMENWAY,
Troy, N. Y.

The Compression of Steam.

Mr. Editor:—

The ventilation, so to speak, of the theory of the compression of steam, which has appeared of late in your columns, is one I have long wished to see, and which must be very interesting to all engineers who wish to get at foundation facts connected with the economy of steam.

The study of such articles as those written by Mr. Church, Mr. Sweet, H. T. and others, ought to keep ordinary men like myself silent, but after reading H. T.'s communication in your last issue, in which he so admirably states his view of the subject of "compression," I became possessed of a desire to dip my oar, or pen, into the discussion.

Abler men than I might defend the practice of compression, but most of them seem to think the subject so plain that it needs no champion, which is a mistake; as such logical arguments as H. T. sets forth against it, would indicate that sound reasons are yet opposed to that practice.

The law of compensation mentioned by H. T. made me very skeptical, for a time, as to the benefits of compression. But the unmistakable economy of its practice has kept me studying for other reasons by which to explain it.

We may safely say: the main object of the most successful modern engineers is to secure hotter cylinders, with the smallest surfaces for the absorption of heat from the entering steam; the direct outgrowth of which is the compound engine, high piston speeds, steam jacketting and smaller engines.

The most serious loss of cylinder heat is that occasioned by the low temperature of the exhaust steam, which tends to rapidly lower the temperature of the inner surfaces of the cylinder during the whole of the time the exhaust part is open.

With modern piston speeds, the friction of crank-pin and journals, instead of being increased by compression, will be decreased, because the compressed steam receives the pressure that would otherwise be brought

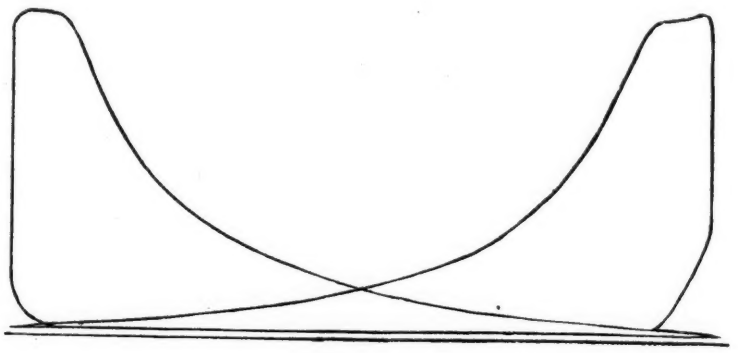


Fig. 1.

upon the crank-pin and journals in arresting the motion of the reciprocating parts. Aside from this question of friction, I think H. T. will admit that compression does no harm, for it certainly gives back all the power it absorbs.

Taking one end of the cylinder into consideration, without compression, the surfaces of that end are affected just one-half the time by the heat stealing exhaust, and one-half by

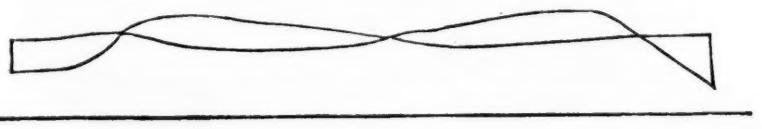
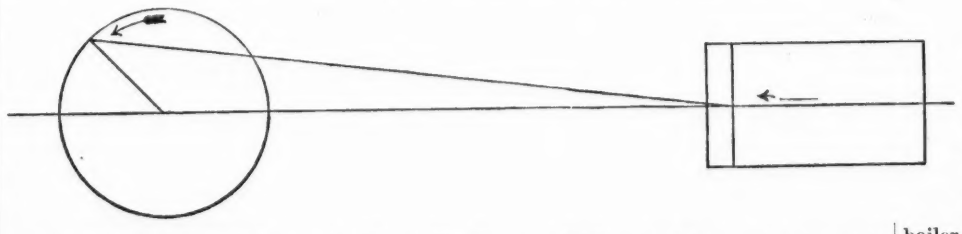


Fig. 2.

the heat adding live steam. The ratio of length of intervals of gain and loss in such a case is 1 to 1.

Now, taking a common case where compression begins at $\frac{1}{4}$ stroke, we will see, by referring to the sketch, that in point of time, which is determined by the position of the crank-pin, the engine has made but $\frac{3}{4}$ of its stroke, and the interval of cooling by exhaust is reduced $\frac{1}{4}$ in length, changing the ratio between intervals of gain and loss to 5 to 3. A very little earlier close of exhaust port



would have made the ratio 2 to 1, either of which is none too small a gain to be ignored. This, of course, refers to the cooling by the exhaust alone. The reduction of temperature by the expansion of steam before exhaust is an obstacle in the way of economy, but the heat thus taken from the cylinder is not wholly lost, as in steam jacketted cylinders especially, it appears in work accomplished, unlike that taken up by escaping steam which is entirely wasted.

After long study, I can see but two points in favor of compression: 1st, the benefits of cushioning obtained; 2d, the valuable increase of the temperature of cylinder. To be sure, it may also be useful in correcting the terminal pressure where engines are too large for their load, but a better way would be to substitute smaller cylinders, or slow the speed of engine, as too much compression is severe for the engine, and has a bad tendency to lift the valve from its seat, which would waste more steam than it saved.

I presume there are other points not yet mentioned in connection with this subject, and I, for one, and no doubt all your readers, would be greatly benefited if Mr. Church, or some other good authority, would set them forth in a lecture, with "Compression" for its text.

Dunkirk, N. Y., July 28, '79.

F. B. RICE.

Three American locomotives were shipped to Australia some time ago, and orders have lately been received for more. They are found to be superior to those imported from England, and to require less fuel.

Forty-five locomotives, valued at $312,000 were exported from the port of New York from January 1 to June 30 (of which the Baldwin Locomotive Works, of Philadelphia, made 44), against only thirteen last year, valued at $115,000.

During the first half of the current year there were also shipped 157 passenger and freight cars, valued at $143,000, against 106 last year, worth $83,200.

Engine Proportion and Construction—The Cylinder, Its Jacket, Ports, Etc.

Editor American Machinist:

In speaking of this matter of proportion and construction I hope you and your readers will not set me down as a fault finder. That is not my mission in these writings. I am only hoping that these two important subjects will be discussed in your valuable journal by other engineers far better fitted for the task than your humble servant.

Steam cylinders in this country have, up to a very short period, rarely been fitted with a live steam jacket The subject of jackets being one of such wide difference of opinion among our engineers, the builders have, in nearly all cases, taken what they considered the safe side of a doubtful question, and have not used them.

I believe steam jacketing, when properly applied, to be a fuel-saving device; but it has so often been constructed without due attention to the collection of water from condensation, that it has no great achievements to boast of as yet.

A live steam jacket must be entirely free from water at all times, or it is not only useless in saving fuel, but will actually cause a loss at this point. In the first place, in arranging the steam and exhaust ports in a horizontal steam cylinder, the bottom line of passages should always be below the lower line of cylinder bore at least one inch, the points of removal of water from these ports and the cylinder ends easy of access, the openings of large area, and the automatic arrangement a simple, substantial, shifting valve made of brass entire.

The steam jacket relief must not be connected to the passage drainage at any point, and must consist of a large, perfectly reliable, self-acting trap, and every angle, side, end, or corner, entering into the design of cylinder and jacket, must have a downward course toward the trap. The outside case of the jacket must, of course, be covered with a good non-conductor, and under the above named conditions, the steam jacket is a benefit.

Referring briefly to the area of steam and exhaust ports, I will close. I have in my mind only those engines provided with separate and independent steam and exhaust passages. When the old speed of 350 feet travel per minute was the standard, one-sixteenth the area of piston for the steam port, and one-thirteenth for the exhaust, was considered the "proper thing," and a very good proportion it was. But, Mr. Editor, I can show you some of the old engines, made by this standard as to ports, running to-day, not at 350 feet per minute, but at 520 feet travel, having been changed by request of owners and by mild consent of builders to increase power, and obtain the advantage in quick piston speed. What is the result? Initial pressure twenty per cent. below boiler pressure, and a uniform back pressure on the piston of from three to five pounds per square inch. Believing the most economical piston speed to be not less than 600 feet per minute, I have designed engines of various kinds and sizes, with steam and exhaust ports particularly proportioned to speed. In some cases, the pistons are speeded at 680 feet per minute, and I have found no difficulty in showing an initial cylinder pressure within three pounds of the boiler pressure, and no uniform back pressure.

I cannot see why so many of our engine builders still continue to guarantee certain duties as to fuel, at the same time never changing the ports in area to suit their much-increased piston speed. The laws regulating this matter of port area are just as rigid and unbending as those relating to the strength of materials, and must be observed in construction with the same care.

I will add here, that the diagrams taken from cylinders mentioned, as having ports proportioned according to proper rules, did not show a finishing corner on the return, looking as if made with a square, but they did show a compression within fifteen per cent. of the initial pressure, and that to some purpose, in the matter of fuel and wear and tear.

WM. H. HOFFMAN,
Passaic, N. J.

It is not often that statistics of a more suggestive character are presented than those furnished by the British Iron Trades Association, in their last annual report. They find that during the year 1878 there were 277 strikes in Great Britain, classified as follows: coal mines, 58; iron ship-builders, 6; boiler-makers, 4; building trades, 77; various trades, 112. The strikers were successful in 4 cases out of the 277; 17 cases resulted in a compromise; and in 256 cases the men went back to work on their employers' terms.—*Boston Commercial Bulletin.*

The Industrial Exhibition that was to have been held at Moscow this year has been postponed until 1881, owing to the great depression in trade.

There are said to be about 30,000 telephones now in service in this country, and only 500 in England. This is a good example of the comparatively slow progress of new inventions in the mother country.

In the tests of water-wheels, soon to be made at Holyoke, Mass., it is proposed to arrange shafting so that the loss in transmission of power from water-wheels to machinery by gears and belting may be definitely measured.

Extracts from Chordal's Letters.

Mr. Editor:

* * * * * If machine men will only try hard enough, they can become the most bigoted and narrow minded men on the face of the earth. There is no liberal art nor exalted profession which should be more allied to broad and liberal views than this same machine trade of ours. A machinist can, if he will, see something every day to admire and condemn; but, if he sees fit to narrow himself down to his own product, and be indifferent to the advances of others, he will soon find that the world is willing to leave him among his idols. A machine man is naturally of an inquiring mind, and if so circumstanced that he must stay by the shop, he will always welcome the man from foreign parts, if said man seems to be square in his ways. The stranger is a pig iron man, or oil, maybe, or coal, or steam gauges, or belting, or packing, or governors, or steel, or boiler insurance, or glue, or wire brushes, or most anything, and if he is smart enough to be liberal in his views, he can always be sure of a welcome in distant shops.

But if this stranger never heard of any oil but our oil, and never saw but one kind of steam gauge or governor, he had better be sure his man needs stock badly before he approaches him.

I saw a nice axample of this not long ago at the shop of Cook & Raven. Cook is the machine man and was absent. Raven is a new man and knows nothing of the trade, but is a long headed business man, and has succeeded in rubbing more knowledge off of other people and on to himself, than any green man I ever saw go into the machine business. A steam gauge man came along; Raven treated him nicely, and at once proceeded to acquire knowledge of steam gauges in general,—only he didn't—for this chilling steam gauge man, who knows as much about gauges as any body, would not swerve from his beaten track of trade any more than an insurance man. Had never seen this gauge, had heard of that one, didn't know how the other one worked, but one thing he could assure Mr. Raven: There is only one good gauge made, and that is the one I have here. With the most delicate politeness, Raven told him that he needed twenty gauges; Cook was away and he knew nothing of the merits of gauges, but would quickly order on information obtained from one giving evidence of comprehensive knowledge upon the subject, but is under the impression that the present company is as ignorant as himself, and therefore not able to give information on which discriminating judgment may base an order. Steam gauge man had to go.

Raven told me that he would not hesitate to buy anything he wanted if the seller showed himself posted in his art, but would give no credence to "pat" representations. I simply mention this as an example. Machine men in talking to customers are too apt to decry products worthy their highest admiration; and if a customer is sharp, he will suspect a lack of judgment or candor, and will naturally be shy. Most machine men are honest in lauding their own products, but exhibit weak short-sightedness, if they withold fair opinions of competing products. The highest compliment I ever heard paid to a Sellers' planer was by a tool builder, whose own novel planer is hardly inferior to that of Sellers. He was at the time trying to negotiate a planer trade, and told me that if his opinions cost him the trade, they would win him credit for good judgment, which would have its effect on many future trades.

* * * * I wish you would get the new twisted drill company into a corner, where they couldn't get away, and inflict my late sermon on drill shanks on them. The more I see of drills, the more I am convinced on the straight shank question.

I always did hope the Morse Company would make some move in that direction, without waiting for a demand. Such demands never come. The twist drill itself, the most perfect and beautiful iron cutting tool ever devised, was never demanded. It made its own market. I have never ceased admiring the products of the Morse Company, but for the good of the craft must feel glad that a little competition arises. I never had any fault to find with the "business" end of the Morse drills, but if the other end don't receive some attention from some of the makers, it won't be because Chordal has not wrestled with them. * * *

I think Congress failed to make an appropriation for purchasing twist drills, because when I was last in the Washington Navy Yard I saw nothing but home made ones, and bad ones at that. I examined one very closely, and really believe that better ones could be raised from onion seed.

* * * * You lately published a list of books adapted to the wants of machinists, and it is the first thing of the kind I ever saw.

The question is asked, of some one sup posed to know, about a thousand times a year, but I never knew of an answer being given before. Mechanics, as a general thing, are pretty well advanced in years when they want these books. They can't comprehend anything fine or deep, or analytical, and cannot spend time to attain the necessary elementary book knowledge. They despise a book which treats them as children. Walker is a carpenter, and is patronizingly urged to go to the library and read up on his trade, and rise in the world. He knows nothing of books, and takes the first one with carpentry on the back of it; say, Constructive Carpentry Practically Considered. He could not define the title to save his neck, but proceeds to look into it. He finds many demonstrations and geometrical diagrams, but he can't get into sympathy with the thing; says the author's a fool who couldn't shove a saw, and he puts the book away. He takes another, the Complete Carpenter. On the first page he sees a villainous cut of a saw, and he reads "This is a hand saw used by carpenters to cut off boards. It has teeth upon one edge. These teeth are about one-eighth of an inch apart, and are bent alternately, slightly to the right and left. This heading is termed 'set' etc., etc." He puts this book away in disgust, and says the author thinks *he* is a fool who can't file a saw.

Walker won't read one book, and can't read the other. The book for him must be tailor-made, and must fit him exactly, or he can't get any good out of it.

The thing is a problem, but there is one good thing about it. If a man has to ask what to read, it don't make much difference what he does read. A thirst for knowledge will find its own means of satisfaction, and this thirst will never come upon a man in middle life. There is no boy so circumstanced in this whole land, that a thirst for technical knowledge will not, in a way, develop and gratify itself before he is twenty. If there is anything in him, he will have formed an acquaintanceship with books in general, and need ask no questions relating to general direction of study. If such an acquaintanceship has not been formed, friends need hardly regret being unable to suggest a proper path of study.

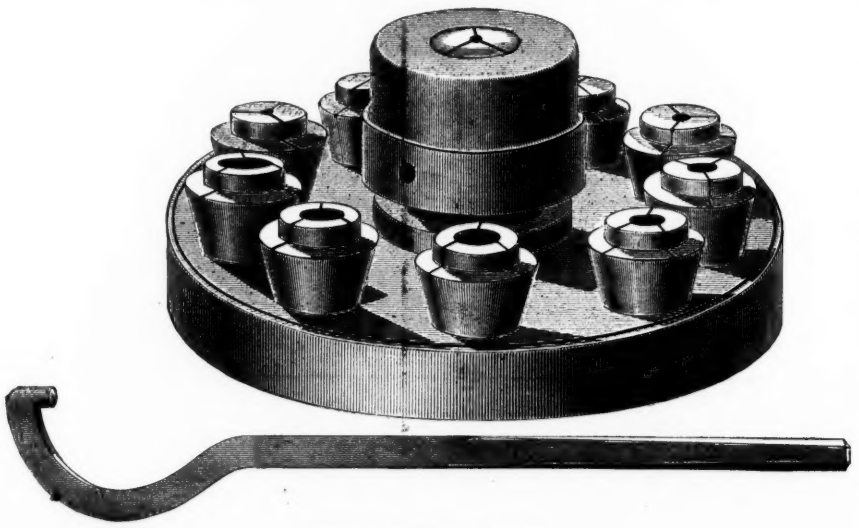
I was in the office of a certain engineer the other day, and a mutton-headed boy, about nineteen came in. He was a machinist. His father owned a shop, and he had served his time in it. He wanted to learn to "draft," he said. Said his father wanted him to learn; he wanted to learn himself, and his father would pay all reasonable bills. Torsion, the engineer, began to catechize him. What have you ever drawn? Nothing What have you ever made rude sketches of? Nothing. What have you ever wanted to draw? Don't know as I ever wanted to draw anything, and could not make a "draft" if I wanted to, because I never learned how. That's all right, said Torsion. You will never "draft" anything, and will never want to. I'll see your father this week. Torsion turned to me and said he had a dozen such fellows to deal with every month, and treated them all the same. But, said he, when some greasy boy slips in here, and pulls out some horribly original drawing, and asks me why the ink lines run when he puts color on, or how a fellow's to judge good india ink, or how this thing is to be drawn so another can understand it, then I quit work and stay by that fellow, and place my time and library and office at his disposal.

* * * * * I see you announce the fact that some one is in labor with a new indicator. I have some very unorthodox views of the indicator. It has two functions. One in the hands of the engine tender to allow him to keep his valve motion at its best practical point, spite of adjustment and wear; and the second in the hands of the expert to allow him to study on the action of steam. Its first function, it performs in a perfectly satisfactory manner, and in the second also, perhaps, though that question is now being pretty well overhauled by your contributors. Experts decry the use of the indicator in the hands of engine men; think the art will become degraded, etc., etc. Not a bit of danger. An engineer, with skill enough to give a fifty horse engine proper attention, can use indicators for the purpose specified, as well as any expert living, after he has learned the simple trade (for it's nothbut a trade) of taking diagrams, and these diagrams will tell him just what he wants to know. But there he stops. The scale, the logarithms, the hyperbolic lines, and isothermal lines, and adiabatic lines, and doubtful tables of density—these belong exclusively to the expert, who, if he doubts the accuracy of the cards taken by the engine man, may make others for himself with more delicate instruments. If the engine man happens to be an expert himself, so much the better. I believe indicators should be permanently attached to every engine of considerable size, and that the tender should be skilled in their use. This might be bad for experts, but would exalt their calling, which seems to be what they want.

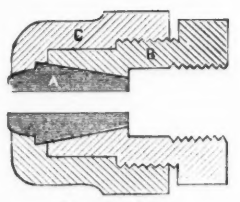
I saw a couple of cards taken from a high class engine in New York or Boston, I forget which, by Mr. Bacon. The first was fearful, and must have suggested to Mr. Bacon, danger of a coal famine. The second was after the valves had been set where they belonged, and was a beauty. I don't know how much figuring Mr. B. did on these cards, but he certainly looked upon them as means for arriving at theoretical or practical conclusions. A good engine tender would have looked upon them simply as an indication that his valve motion was off. The makers of first class engines adjust them by indicator to the best practical conditions, and the engineer could, with a model card in his hat, keep it so forever, if he had indicators.

The common plan is to let bankruptcy approach, and then send for a scientific expert to do purely mechanical labor on the engine—labor which should have been done a week after the engine started, instead of two years after. * * * *

Very respectfully, Chordal.



Improved Wire Chuck.



Chuck Jaw.

It is important in workshop manipulation to remember that if a piece of cast steel be made red hot and quenched in cold water it will become longer, but if the same operation be performed upon a piece of wrought iron it will become shorter.

Snow is shovelled out of a large granite building in Boston every morning, and the boys may play at snowballing in a temperature of 90 degrees, if they are quick about it. The building is a warehouse for the storage of perishable provisions, and the air in it is kept at 40 by refrigeration with ammonia. The snow gathers constantly in the machine room.

What ails England!—Sir Francis Hincks, president of the Consolidated Bank of Montreal, which suspended recently, loses $60,000 by the suspension, which will unload him completely. He has, however, a pension of $10,000 annually from the home government.

Improved Wire Chuck.

The cut shown herewith represents a new wire chuck, the principle of which is well known in many localities, though it is claimed that it has never before been made in so substantial and simple a form. As will be seen, in the sectional view shown here with, the split jaws are provided with a flat shoulder against which the cap draws—the rest of the front end of the jaws passing through to the face of the cap; the advantage of this protection in working small diameters is obvious. The body of the chuck is cut directly to the thread of the lathe spindle, making the stiffest form of chuck that can be had, and it cannot get out of true unless the spindle itself wears to one side. The jaws have scarcely any sliding motion in clamping, therefore they cannot wear out of true. They are bored and reamed to standard size, turned to the exact taper in the body of the chuck, and sawed open by index. The manufacturers claim for it the following advantages:

1st. Perfect steadiness, so that there shall be no "chatter."

2d. The most permanent accuracy.

3d. The greatest durability.

4th. The strongest chuck, in proportion to its size, known.

5th. The cheapest and best chuck in every sense.

6th. It will not knock the skin off the knuckles.

7th. It wil not scratch or mar the work.

8th. It will never let the work slip.

9th. It will hold on the twist of a drill as well as on the shank, it being often desirable to shorten the drill when working against the tail center.

There are ten sets of jaws of the following sizes: $\frac{3}{32}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$ in.

The makers also claim that, owing to the number and arrangement of parts, the size can be changed in ten seconds, while, instead of three jaws, there are thirty amongst which the wear is distributed.

Studs, bolts, cap screws, spindles, tubes, and long rods can be taken, after turning in

the engine lathe, and held in the wire chuck to file, turn or polish with firmness and accuracy, without being marred by the jaws. This chuck is also adapted for use in hollow spindle lathes, either engine or hand. A spanner, forged from the best tool steel, is provided, to enable the turner to get a firm grip in case of a heavy strain, such as cutting threads with a solid die, but for light work the grasp of the hand is sufficient. A neat stand of black walnut is provided in which to hold chuck and jaws.

The chuck can be readily fitted by the manufacturers to suit any lathe, if a steel ring, turned so as to exactly correspond with the lathe spindle on which it is to be used, accompanies the order; but if the diameter of the lathe spindle be larger than 1⅛ inch, the chuck would have to be cut directly to the spindle.

This chuck is made by Stone & Hazelton, 55 Sudbury Street, Boston, Mass.

The "$150" Back-Geared Engine Lathe.

The lathe called by the above name, and illustrated herewith, is made by H. L. Shepard & Co , 331 to 337 West Front st., Cincinnati, Ohio, and is designed to supplement the well-known smaller tool, known as the "$50 Screw-cutting Engine Lathe," made by the same firm.

This lathe swings 12x38 inches, with gap, 20x4, or is made without gap, if desired. When intended for power use a countershaft is furnished in place of foot motion, or both foot motion and countershaft may be obtained to special order.

This is a new 1879 lathe, and has a new improved rod feed and steel screw on the back; also a wrought-iron rack, while the cone has been made two inches larger for 1¼ inch belt, being now 8 inches. The gearing also has been made two inches larger than formerly, giving, it is claimed, sufficient power to turn a 20-inch wheel by foot easily out of iron. The reverse in the head stock enables the operator to chase right or left hand screws without stopping the lathe, while for quick work all gears can be thrown out of mesh in an instant, removing wear from parts not working.

The front bearings on this lathe are 1⅛ inches and 2¼ inches long, while the back bearing is 1⅜ inches. The spindle is of steel, having a 7-16 hole through it. The boxes are made of the best gun metal, and the face plate screws on, while the centers fit taper holes, and are interchangeable. The bed has four V's, and is planed and polished. The slide rest is gibbed down, front and back, with new steel-spring gibs, which hold the rest down tight without regard to wear. The tool is raised or lowered by means of a screw at the back, while the polished rest swivels all around the circle. The tail stock sets over for tapers, and is fastened down with cam fastening. The crank shaft runs on friction wheels, with a foot motion of six inches raise and fall.

The gap is a box core, having the same strength as elsewhere on the lathe, and enables a wheel or crank to be bored or turned 20 inches in diameter and 4 inches wide. With each lathe are furnished a six-inch face plate, and two point centers for iron; also the necessary wrenches and gears to cut from 5 to 80 threads.

The Fernandina (Fla.) *Mirror* reports that the machinery lately brought to that place by Prof. Loomis for the preparation of palmetto fibre is working satisfactorily, and that the experiment is an assured success. The stalks of the scrub palmetto are used. It is said that the fiber is likely to prove useful for cordage, paper, tubs, pails, flour barrels, boats, powder kegs, and no end of other articles of general use.

The Second Avenue Railroad Company are making a movement in the direction of rapid transit that is exciting considerable attention among railroad men. Within the last few days five compressed air motors of the Pneumatic Tramway Engine Company have been used on the road with satisfactory results.

Advantages of High Speed Engines.

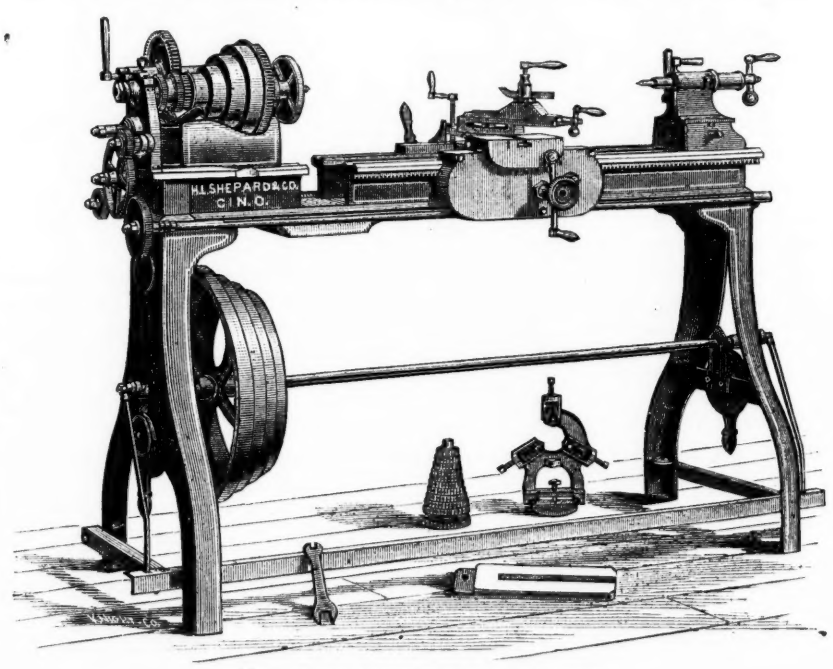
No. III.

BY CHARLES T. PORTER.

There are obvious advantages in the horizontal form of the steam engine, that have always recommended it to Americans. It is the cheapest form. Indeed, it admits of remarkable achievement in this direction. Its various parts are quite accessible, and lie in nearly the same horizontal plane, convenient for overlooking and for work. The cylinder is readily freed of water, at both ends alike.

Then there is required for the production of a tolerable engine of this form, but a moderate amount of engineering knowledge and mechanical skill.

So in the earlier days of our vigorous national life, as in many communities the demand had to be met for steam power, to be provided at once and at home. By a common instinct, horizontal engines began everywhere to be made; and multitudes of these, on timber beds and with a pitman of the same material, have played successful and important parts in the development of our national resources. But while thus adapted at once to the demands and the deficiencies of a new state, on the other hand, the horizontal engine possess remarkable capabilities of excellence, as will appear when we consider its adaptation to the requirements of high speed



New Back Geared Engine Lathe.

engineering. Watt observed that, as an average, London draught horses walked at the rate of 2½ miles an hour, exerting a force of 150 lbs. He adopted this rate of motion, or 220 feet per minute for his piston travel, and each 150 lbs. of pressure on the piston moving at this speed he called one horse-power.

Until a comparatively recent period the piston travel was never allowed to exceed 300 feet per minute. The demands upon the locomotive first broke the spell of this fixed usage.

The American builders of variable cut-off engines, filled with progressive ideas, in engines of 6 feet stroke making 50 revolutions per minute, advanced the piston speed to double the old rate. In the Corliss Centennial engine, the pistons moved 720 feet per minute. In some Corliss mill engines, this rate has been considerably exceeded. In steam boat engines, with strokes of from 12 to 15 feet, 900 feet per minute is not an unusual travel. In all these cases great length of stroke is employed.

By high speed, as the term is now used, however, we mean high rotative speed, obtained by connecting a swiftly moving piston with a short crank.

The revolutions per minute in this class of engines may, for ordinary practice, be taken at from 400, with a stroke of twelve inches, to 125, with a stroke of 4 feet, requiring a piston travel of from 800 to 1000 feet per minute.

From their headgear the slaughtered Zulus as presented by the illustrated papers, seem to have died in the wool.

One Cause of Boiler Explosions.

"On Mechanic street," says the Newark *Register*, "is a firm the head of which is a man well know for his liberality. One day this week his assistant had occasion to be away from his duties, when the proprietor put his engineer in his place. Not being used to the laborious duties of lifting heavy bags of coffeee, etc., he complained to Mr. —— of his inability to lift so much. Alas! without avail. Before the day was over the young man had lifted so much that he at last injured himself. He at once informed Mr. —— of what had occurred, and sought to procure a man in his place, and thus prevent his employers being put to any inconvenience. Having completed his object the young man left his substitute in charge. After the day's work was over the new man proceeded to fill the boiler with water, and the fire box with coal, but unfortunately left the draft door open. When the night watchman came on his rounds he saw at a glance that something was wrong, and proceeded to call engineer No. 1. When they arrived at the building the whole trouble was seen at a glance, and an explosion prevented. The next morning engineer No. 1 reported himself for duty, but to his utter surprise Mr. —— informed him that his services would be dispensed with, notwithstanding that the firm were cognizant of the narrow escape they had had the night previous, caused by an inexperienced engineer. It may here be stated that engineer No. 1 received $13 per week, and engineer No. 2 took the position for $10, the firm thus saving $3 per week at the risk of having the building blown inside out. So much for economy."

George W. Cusick, engineer of the steamtug White Fawn, was put on trial before the Inspectors, charged with burning the boiler of the tug, and also with being drunk on the 9th of July. He took out the tug, but could not get any steam up, and, on an examination being made, it was found that the crown sheet of the boiler had settled, and the rivets and braces were loose. The Inspectors found the charges fully proven, and revoked Cusick's license indefinitely.

The man who complacently sits down when trouble overtakes him deserves his ill-luck. But the man who will stand up and manfully fight the world is never pushed to the wall but once.

Philadelphia is rightly named the "City of Homes." Thousands of her skilled workmen own their own dwellings, with more abundant light, air, and room, than seem likely to be possible for workingmen in New York for many years to come.

The modern man who has a telephone in his cottage performs greater wonders than the fisherman of the "Arabian Nights" who liberated the genii from the bottle.

Styles of Engine Beds.

Passaic, Aug. 7th, 1879.

Editor American Machinist:

In your number of August 9th, Prof. J. E. Sweet speaks of the banjo or girder engine frame. I am pleased to see such an eminent engineer take this important matter of design into consideration, as all persons discussing the subject will be sure to receive fair treatment at this gentleman's hands—at all events. I will say to the professor, in explanation to my comments, that my principal objection to the girder or banjo bed, as relates to its resistance to strains, is its want of *transverse* strength (due to its "goose neck" form in construction,) or what the nautical man would term "lack of beam"

While I would not desire to compare an engine bed with the frame or goose-neck column of a slotting machine, yet I contend the severest strains received on one are identical with the other, though the slotter bar is driven by a crank dependent on a differential shaft motion, and though the strains are met in opposite directions. The goose neck slotter frame will *never* be made to do a job as accurate as the old *two* post or column machine, giving the same amount of metal to each, the one is not as stiff transversely as the other. The goose neck slotter frame springs with a twisting motion, giving away in lines at first at right angles or nearly so; so does the banjo bed plate.

Mr. Wm. Wright, of Newburgh, N.Y., has paid more attention, and devoted more time to the matter of engine beds than any other engineer in this country, and although he does construct a bed according to my ideas of a frame for quick speed, yet I do not believe he could be induced to adopt the regular Corliss bed, and the bed now made by Mr. W. is far, *very* far in principle from a banjo frame.

Mr. Charles T. Porter has built the *very fastest speeded* engines in the *world*, and he has adopted the *modern trunk* bed plate, as described in a former article by the writer.

Passaic, N. J. Wm. H. Hoffman,

A son of Louis Kossuth is the chief engineer of one of the Italian railroads, and is in favor of the American locomotive which was sent from the Paris Exposition to Milan for trial. It was refused at Florence. Great opposition is made to it by the Belgian and English makers of locomotives.

Steam mills have been the rare exception in Austria, wind and water mills being the prevailing type. The success which the steam mills of the stock companies has had, has induced, during the present year, the erection of several more large steam mills in different parts of the Empire.

The making of American textile machinery rivals in excellence that of the oldest manufacturing nations, and the last twenty years, in particular, have witnessed the most remarkable improvements. The present production, per laborer employed, is fifty per cent. more, in the coarser cotton fabrics, and about sixty per cent. in the finer ones than in 1860.

A new sphere of usefulness for the superabundant products of the oil wells is said to be included in a discovery by which a superior quality of refined iron can be produced from common scrap iron. Either crude or refined oil may be employed, and the process by which the iron is made, is known as the "oil-fuel process."

The largest steel cannon ever cast in Russia is now the subject of experiments in St. Petersburg. It was made in the Government foundry of Obukhoff; it is 16 inches in diameter, 120,000 pounds in weight, 35 feet in length, and throws a ball nearly five miles.

The Vulcan Iron and Steel Works, St. Louis, are completing their arrangements to resume operations on October 1st, with a force of upwards of 1,200 men. They have already enough steel rails contracted for to keep them running six months on full time.

Use and Abuse of the Engine Lathe.

No. II.

BY L. F. LYNE, M. E.

In our issue of June 28th was published an article bearing the above title, and in which I promised to discuss the subject still further when opportunity should offer.

I will mention a few points in regard to square centering. I have visited very few shops where proper attention is given to keeping square centers in order. The usual way of fitting up a square center is to first anneal the steel, turn up the center, fit it to the spindle, and turn up the point to fit the center gauge. It is then filed square and tempered. After it has been used for a short time it becomes dull, and now the trouble commences. The lathe hand, instead of taking the center gauge to the grindstone with him and grinding the center to fit the gauge, will rush for the grindstone and grind only that part of the center which has been dulled. The consequence is that the square center becomes more blunt, and this derangement is increased every time the center is ground. It is an utter impossibility to get a good bearing on the centers of the lathe by the foregoing process, for obvious reasons; and after the work is placed on the centers for turning it will be noticed that, the dead center will have to be tightened frequently in consequence of the narrow bearing on the inner edge of the center, and while this edge is being worn away it also cuts the center of the lathe; whereas, if the square center had been made properly, this difficulty would not appear. An examination of the dead center of a lathe which has been run by a man given to the practice described will show it to be full of grooves, and it is useless to try to do a fine piece of work on a lathe while the centers are in such a condition. The writer has found, during his experience, that machinists do not like a long job at the grindstone, therefore they get away from it as soon as possible, and the reason why the square center is neglected is simply because there is so much stock to grind off.

What I believe to be a good plan is, to cut a groove between each of the four cutting edges of the square center. These grooves are to be put in either with a file or tool as may seem the most economical. The object of these grooves is to reduce the amount of surface, so that the center may be ground quicker and its former shape retained, besides allowing the oil to enter and the chips to escape more readily. A square center should always be kept a little sharper than the other centers as it will wear more rapidly. In square centering a piece of round iron, a great many men will use a tool shaped like a V, and this being placed in the tool post, is pressed against the work in order to hold it firmly in position while the square center cuts its way to the required depth.

In many instances the end of an ordinary lathe tool is used in the absence of the V, or fork. I condemn both, simply because they are not practicable, and will give one illustration. A machinist, with whom I am acquainted, was ordered to turn up a shaft 7 inches in diameter and about 6 ft. long. It was placed in the lathe and a V placed in the tool post; the lathe was then started and, after running the square center in so deep as to cover the cutting edges, the lathe hand found that he could not get it to run true; consequently, the job was spoilt, as there was barely enough stock on the shaft to allow it to be trued up. I noticed the cause of his trouble, for at every revolution of the shaft the carriage would be tipped up, the pressure coming square against the tool post, so as to allow a variation of about $\frac{1}{16}$th of an inch on the shaft. The shaft was taken out of the lathe, a hole drilled in the place of the center, and a plug inserted. The shaft was replaced, but instead of using the V, or the end of a tool, a piece of tool steel was heated about 6 inches from the end and bent edgewise to an angle of about 45 degrees with the body of the tool. This was placed in the tool post with the bent part down; the lathe was then started, and the tool pressed against the shaft, when, much to the surprise of the lathe hand, the carriage did not tip as in the previous case, but retained its position, so that in a few minutes the centering process was completed. Now, the whole can be made plain in a few words, viz.: the use of a V, or the end of a tool, caused a direct horizontal pressure on the tool post, which had a tendency to tip up the carriage, also to lift the tool post from the carriage; whereas, by using the other tool described, the pressure had no tendency to lift the carriage, but rather to keep it firmly in its place. Hence, by this process, a shaft can be centered very quickly. Another very common practice is to allow the spindle to play endwise, so that when a piece of work is placed on the centers, the collars on the spindle will be pressed against the brass boxes and very soon commence to cut. Not only this, but when a piece of work is placed in the jaws of the chuck to be faced off, it will be found very difficult to do it true, if it is possible to do it at all, on account of the variation caused by the spindle moving endwise. This difficulty becomes more apparent in cutting a thread inside of a hole where a good fit is required.

This fault is about equally divided between the workman and the man who designed the lathe; for if the end thrust of the spindle is taken up by means of a hardened steel set-screw there is danger of cutting.

The best bearing that I ever saw was a small disc of rawhide inserted between the end of spindle and set-screw, the brass bearing being so constructed as to cover the end of the spindle, thereby making it utterly impossible for the parts to be injured by cutting. I have often been asked the question, Should the live center be tempered? and I say, Yes, but it is not necessary to make it as hard as the dead center. I am in favor of trueing up centers by means of a grinding device, which is not only quicker and insures a true center, but the necessity of removing and annealing the center is thereby avoided. It frequently occurs that when a driving belt on a lathe becomes too loose the lathe hand will run it up on the next speed in order to avoid the trouble of lacing it. It will be observed that the belt will run only about half the width on the cone as the other half projects over the edge. This fault is more commonly practiced on drill presses, as no one will take up the belt if he can help it. The bosses are to blame more than the men for allowing these things to occur.

While passing a lathe one day on which a large box was being bored, I noticed that it made as much noise as a threshing machine, and upon asking the lathe hand what was the trouble, he said, "Oh, it always acts that way on heavy work." I told him to stop his lathe, and then made an examination, when it was found that the screws which held the caps over the boxes on the spindle had worked loose. I inquired why they were not tightened, and was told that they would work loose again. We then put some small liners between the cap and the casting and set up the screws tight. The lathe was then started and it cut smoothly and with very little noise. This illustrates a common practice, for there are few, if any lathes built, upon which the screws fit tight enough to retain their position, and the lining process, if thought of, is neglected. I was in a shop the other day and saw a lathe upon which was a face plate which resembled a "cocked hat" rather than a face plate, for in removing it either a hammer or a lathe tool had been used, and at the time I saw it, about one-third had been knocked off. I hardly understand how it is that proprietors will buy good lathes and then allow their men to deliberately knock them to pieces. Not long since, I observed a lathe hand asleep alongside of his machine upon which there was a belt feed. The belt was not sufficiently tight, as is generally the case, to drive the feed, so the pulley on the end of feed screw lost about one revolution in every three.

I never knew this to occur when gears were used to drive the feed. It is bad policy to allow lathe tools to become common property in any shop. For instance, a lathe hand requires a certain tool; he goes from one lathe to another to prospect, and does not find exactly what is required; he then takes the tool that comes nearest to it, goes to the grindstone, and partly succeeds in getting what he wants; the tool is placed in the tool post and a cut started.

In the meantime the lathe hand from whose machine the tool was taken, returns, and has occasion to use the same tool. After looking for it in vain on his own lathe, he comes to the conclusion that some one else must have it, so with a few violent gestures, and some very expressive language (not found in Shakespeare) he starts off in search of his tool, and when it is found, there is more trouble, the amount of which depends upon the feelings of the two men towards each other. This I have seen occur time and again, and fail to see in it anything that has the appearance of economy. In my experience I have found it best to have tools for every lathe and have the lathes numbered, placing the same number on all the tools.

NEW CUTTING NIPPERS.

It becomes necessary sometimes to borrow tools, but it should not be done surreptitiously, and in no case should a tool be altered except by mutual consent.

It would be advisable for all persons who are about to purchase a lathe to select one with the leading screw independent of the feed, for the screw should be used only for cutting threads.

A leading screw, when badly worn, will cause great trouble in making a close fit on a thread, for the distance between the threads will have a constant variation. All leading screws should be made so that the ends can be reversed when worn, which would not add to the expense. It is of the greatest importance that the bearings of the spindle should be perfectly round, for the journals will reproduce their own shape, hence the reason that pieces of turned work often have flat places in them, the amount of variation increasing in proportion to the deviation of the journal from a perfect circle.

The turning lathe is the first tool that becomes necessary in a shop, and is at the same time the most useful, therefore it should be kept clean, in good order, and never neglected. Notwithstanding the able articles and treatises which have been written upon the use of tools, there are still some men that will use a tool which is perfectly flat on the top for turning wrought-iron, which, instead of cutting a clean, continuous chip, will dig, or tear it off in little pieces. It does not make any difference what metal is to be turned, a tool should always cut clean, in order to save power and avoid unnecessary wear and tear of the lathe.

When a lathe has been used for a time, it will be noticed that the journal next to the face plate will be worn down much faster than the other bearing, owing to the weight of the face plate and the work placed thereon from time to time. The result of this derangement is that in boring a hole with a a tool, the end towards the face plate will be found the largest.

In most cases, instead of lining up the spindle, the lathe hand will feed the tool out or in (as may become necessary) by hand, thereby causing the tool to leave ridges in the hole. To remedy this defect, it becomes necessary to run two or three extra cuts through the hole to make the work passable.

There is no doubt that the most economical way would be to rectify the alignment of the spindle as soon as the fault is discovered. A quick and sure way of testing the spindle of a lathe is to remove the live center, fit a wooden pin to the hole, letting the end project about one inch from the spindle, square up the end and place a sharp point in the tool post; move it up until the point presses the end of the plug just enough to make a mark, and turn the face plate round several times which will make a circle on the end of the stick.

Now, move the carriage back out of the way, remove the wood center and replace it by another about 12in. to 18in. long according to size of the lathe. Move up the carriage until the sharp point previously mentioned barely touches the end of the wood center, and turn the face plate as before, thereby making a circle. The difference in the diameter of these two circles will show the amount of variation in the spindle.

Care should be observed in moving the carriage to avoid shifting the tool post with the point attached.

The first point to be observed in lining up the spindle is to place it parallel with the shears, then test it in the manner described, and if there is still a variation it must be taken off the sides of the bearing at the end of the lathe.

When the circles coincide with each other, the lathe will undoubtedly bore a straight hole, provided the bearings fit the spindle and are properly tightened.

I will leave the subject here and in a future issue will advance some ideas as to what constitutes a good lathe, and its requirements.

New Compound Lever Cutting Nippers.

We illustrate herewith a small, yet remarkably powerful and durable, tool for nipping wire or strips of metal, just placed upon the market by Peter A. Frasse & Co., 95 Fulton Street, N. Y. The tool is called Hall's Patent Compound Lever Cutting Nippers. They are made of an extra grade of steel, manufactured especially for this tool, the different parts being drop-forged. The parts are made interchangeable, and therefore can be readily replaced, when broken or injured, at the cost of a few cents only. By means of these nippers a largely increased power is obtained without a clumsy and expensive increase of size. They are neat, handy, powerful and durable. As the tool is compact, it can be easily sent by mail, to any address in the U. S. or Canada, for six cents postage.

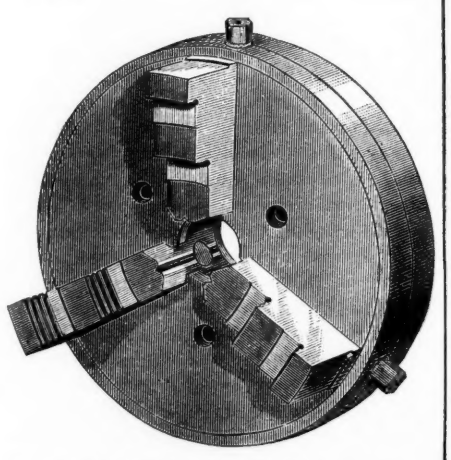
New Hair Clippers.

We exhibit herewith a cut of a new hair clipping tool, for barbers' use, just brought out by the Brown & Sharpe Mfg. Co., Providence, R. I. The clippers are made with the well-known accuracy and reliability of all the tools sent out by this company, and are of such a form as to work with smoothness and ease. The shearing plates are thick enough to allow of repeated sharpening, which should be done only by the makers, or some person having a suitable machine for grinding flat surfaces. Neither files nor grindstones should be applied to the clipper, as it only increases the cost of repairing. Each clipper is nickel plated and put up in a neat paper box, with a wrench to use in adjusting the nut. The utility of these clippers is greater than appears at first sight. They are especially valuable for cutting the hair of an individual who is in a great hurry to catch a train, and they can be used to decided advantage in the capillary department of our growing penal insti-

tutions. The instrument clips smoothly, neatly, and rapidly. A person might take a nap for a few minutes and wake up neatly and fully shorn. If those professors and artists, like the one described by Artemus Ward, who "have long hair and a wild expression in his eye," could be induced to take a little nap within reach of an enterprising barber having a pair of these clippers, nothing would be lost to either science or art. They would also be especially valuable in rendering harmless the modern trade union Samsons, who (unsuccessfully, we are glad to note) frequently endeavor to stir up strife and strikes among machinists and engineers, in the vain attempt to establish one grade of pay for all grades of skill.

The Sweetland Improved Horton Chuck.

The illustrations shown on this page refer to the Sweetland Improved Horton Chuck, manufactured by the E. Horton & Son Co., Windsor Locks, Conn., according to the detailed description given below, as an improvement upon the well-known Horton Lathe Chuck. The object of the improvement is to give the chuck an independent, as well as a universal action, and the novelty consists in the peculiar means employed for attaining this end.



The main feature of the *universal* action is, that the jaws are moved to and from the center universally, by means of the geared screws and the circular wrought-iron rack, which is enclosed in the deep groove or recess in the back plate, and then turning the center faces of back and front plates true, which, when bolted together, makes a perfectly tight casing for the gearing, so that no dirt, chips, etc., can possibly get into them to clog and injure the chuck.

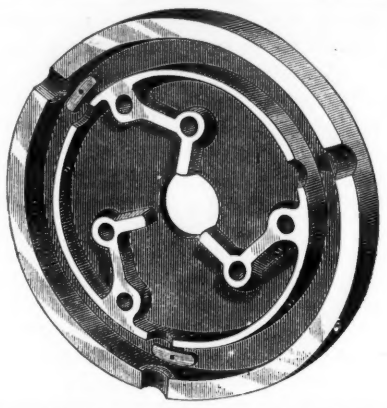
But in the improved or *independent* style, the back side of the circular wrought-iron rack is turned out, so as to have the continuous bevel also cut.

The groove or recess in the back part of the chuck is made deep enough to allow the circular rack to disengage from the pinion gears on screws. In this groove, and back of the circular rack, lie the cam blocks, having bevels to correspond with the bevel in the rack.

These bevel cam blocks have radial motion in the groove or recess of the back plate, as shown in the cuts; and when in position, being moved to the outer portion of the groove and rack, they hold the circular rack into mesh with the screw pinions, and when they are moved inward they allow the rack to unmesh from the pinions. The former adjustment gives the universal action, and the latter, the independent.

The back of the chuck body is provided with slots or radial mortises, and the cam blocks are furnished on the back with posts, which run through and have play in these slots or mortises. The ends of these posts are threaded, and take upon them nuts underlaid with the convex spring washers, which prevent them (the cam blocks) from accidentally moving. The spring washers also form a covering for the slots, to prevent dirt or chips from entering the gearing.

The operator adjusts the cam blocks, by taking hold of the nuts (see cut). The manner of throwing the rack into gear is original, *i.e.*, placing it into each screw pinion separately, and is far better than an attempt to engage



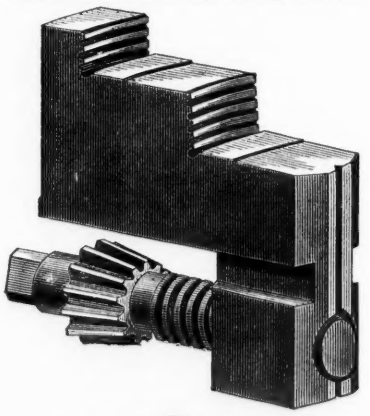
the rack into all of the pinions at one operation, as it will be seen by operating the chuck in practice, that the rack is liable to come in contact with the points of the pinion teeth, and if one of the screws is moved, either to the right or left a little, it will place the rack in the right position to engage with pinions.

The jaws are different and have a long bite on the inner end; are strong in the nut and can be taken out of the chuck without removing it from the lathe. The hole in center of chuck is also larger than is usual for this style of chuck. The nut on jaw is *not* a half nut, but is *full*.

The cuts represent a 7 inch chuck which is 7 inches diameter, and will hold work from ¼ inch to 7 inches inclusive.

The line on face of the chuck is used as a guide for setting the jaws true. The outside of the jaw has a raised place, or projection, which is ground perfectly true with the bite of jaw, and, when set even with the line on face of chuck, the jaws will be in true position for holding work. For instance, the chuck has been used as independent, and the operator wishes to use it as universal: the jaws would be moved inward, so that the raised portion on them would be perfectly even with the line on face of chuck; now throw the rack into mesh with the pinions, and the chuck is ready for universal work and perfectly true.

Respecting the inventor, it may be stated that he has been in the chuck business for fifteen years, and will have charge of the manufacture of this chuck as well as of the regular Horton chuck, which the manufacturers will continue to make, as heretofore.



Prof. Richard A. Proctor, having learned that a lecture bureau had circulated a card naming him as a lecturer now dead, has written a note to the Boston *Advertiser*, in which he says: "As to my being dead, I cannot but think this is a mistake. The study of science suggests extreme caution about matters of fact. But, so far as my own observations extend, I find reason to believe that I am alive. My friends also seem to think so. You must not think me dogmatic if—failing stronger evidence than I yet possess to the contrary—I decline to accept, unhesitatingly, the theory that I am no longer living."

Col. Bolton has made abstracts from all English patents on dynamo-electric and magnet-electric machines and electric lights, classified and arranged in subdivisions according to the special class feature of each form of machine or lamp. He has discovered, in the course of his labors, that several of the so-called new inventions of electric-generators and electric-lamps, or regulators, are really "inventions" of what had already been invented and described in official shape.

The Steam Engine Indicator.

The office of the indicator is to furnish a diagram of the action of the steam in the cylinder of an engine during one or more revolutions of the crank, from which is deduced the following data, initial pressure in cylinder—piston stroke to cut off—reduction of pressure from commencement of piston stroke to cut off—piston stroke to release—terminal pressure—gain in economy due expansion—counter pressure, if engine is worked, non-condensing—vacuum as realized in the cylinder, if engine is worked condensing—piston stroke to exhaust closure (usually reckoned from zero point of stroke), value of cushion—effect of lead, and mean effective pressure on the piston during complete stroke. The indicator diagram, when taken in connection with the mean area, and stroke of piston, and revolutions of crank for a given length of time, enables us to ascertain the power developed by engine; and when taken in connection with the mean area of piston, piston speed, and ratio of cylinder clearance, enables us to ascertain the steam accounted for by the engine.

The mean power developed by engine compared with the steam delivered by the boilers, furnishes the cost of power in steam; and when compared with the coal, furnishes the cost of the power in fuel.

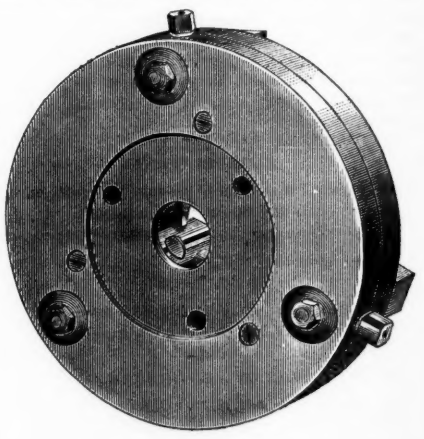
The diagram also enables us to determine, with precision, the size of steam and exhaust ports necessary under given conditions,—to equalize the valve functions—to measure the loss of pressure between boiler and engine—to measure the loss of vacuum between condenser and cylinder—to determine leaks into, and out of, the cylinder—to determine relative effects of jacketed and unjacketed cylinders, and to determine effects of expansion in one cylinder and in two or more cylinders. —*Hill's Engineers and Steam Users Manual.*

M. Plante has lately communicated to the French Academy of Sciences an account of his researches on the effects of the rheostatic machine. By using a machine of 80 condensers, charged by his secondary battery of 800 couples, he obtained noisy sparks more than 0.12 metre long, and when they were produced above an insulating surface sprinkled with flowers of sulphur, they attained even a length of 0.15 metre, leaving a winding furrow. When short of their greatest length, they often formed closed branches like the union of the final ramifications of the veins of a leaf, and, on sprinkled surfaces, resemblances of a tree when the excess of sulphur was shaken off, thus affording a probable explanation of the plant-like impressions sometimes found on the bodies of persons struck by lightning. Little dynamic electricity is required for these static effects.

In nickelizing without electricity, a writer in the *Moniteur Industriel* adds so much of nickel salt to a 5 or 10 per cent. solution of zinc chloride as will make the mixture assume the color of a nickel bath. The articles to be coated, previously well cleaned, are laid in this bath, and the process is completed in from half an hour to an hour. Cobalt may be similarly deposited.

The little "one-horse" railway on exhibition at the agricultural exposition near London, beside which the three feet gauge roads appear gigantic, is attracting much favorable comment as a practical application of steam power for transportation to agricultural and other business purposes on a small scale.—*Railway Age.*

MISSOURI.—In November, 1878, articles of incorporation for the Furniture-Workers Association of St. Louis were taken out by Frederick Bicker, William Pfisterer, Louis C. Steifel, Reinold Amrhein, Fritz Keitel, Charles Steingrabe and Frederick Von Handor. The capital stock of the association was to consist of 2,000 shares, of $25 each, and the object of the undertaking was to enable the poorest mechanic to become a stockholder. The stock was very readily taken up, and the establishment commenced operations under favorable auspices, with a force of sixty skilled workmen. This number has since been increased to one hundred and ten, and the enterprise is said to be making rapid headway. The style of management is very simple. Each man has his particular line of work and his particular machines. Nobody but stockholders are employed. When an order comes in, every workman in the place knows it, and knows, too, just what is the contract price. The Secretary makes an estimate as to what figures this price will allow for each portion of the work, and then, going to the men one by one, says: "We want from you such a number of pieces of this pattern. We receive so much for the job. We will give you so much a piece for your work. Will you do it?" The workman knows whether the price is a proportionate one or not, and if it is he signifies his assent. If he refuses, the job goes to some other man. No stockholder can hold more than twenty shares of stock, and when he desires to dispose of any, the association itself has the refusal of it. By this system the business is thriving, and already $22,000 of the stock has been paid in.



The patient Mosaic-worker in the Vatican Palace dealt with 2200 shades of colored material.

On the 3d of July a business house in Boston advertised for an assistant book-keeper. The morning mail on the 5th brought 347 answers. A firm in Denver, Col., advertised for a young man to help about the warehouse and make collections. It received over 50 replies. Shortly after it advertised for a good wood-turner. To this not an answer was received. These things are significant.

DIDN'T KNOW HER SIZE.—A young man, with the blush of country life on his cheeks, sold out his produce on the market yesterday and entered a shoe store and said he wanted a pair of shoes for his wife. "What number?" asked the clerk. The young husband scratched his head, looked very much embarrassed, and finally said: "Well, I've been married eight months, but this shoe business stumps me. I don't hardly believe she wears 'levens, and I don't think she kin get into fives. I guess if we split the difference we'll hit her pretty close." He was given a pair of eights, and after squinting along the soles he observed: "I guess them'll do. She's awful proud, and I know she'll squeeze into 'em for all she's worth."—*Detroit Free Press.*

The Cincinnati *Gazette* speaks of a young man who shook hands with a lathe. He left a thumb and forefinger as a latheting pledge of his esteem.

An individual who called his first daughter Kate, when his wife surprised him with another girl, promptly christened it Duplicate.

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☞ *We invite correspondence from practical machinists, engineers, inventors, draughtsmen, and all those specially interested in the occupations we represent, on subjects pertaining to machinery.*

NEW YORK, AUGUST 23, 1879.

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Readers would place us under obligations to them if they would send us an occasional item on a postal card, for our department of "Manufactures."

Special.

We wish to make the following facts fully understood by our readers:

1st. That nobody has ever paid the publishers of the American Machinist one cent for anything inserted in its reading columns, either for illustrated descriptions of machinery and tools, contributed articles, editorials, manufacturing notes, book reviews or reviews of shop supplies.

2d. That we never will publish any notice for pay, either direct or indirect, except in our advertising columns.

3d. That no party interested in making or selling machinery, engines and boilers, or in their manipulation has, or ever has had any pecuniary interest in the American Machinist.

Engineers and Coal Shovelers.

In every mechanical occupation there are plenty of incompetent members who put themselves forward with even a greater degree of assurance than those of unquestionable skill and ability. The unwarranted pretenses, however, of most classes of mechanics can readily be detected as soon as the boasting individuals are placed upon any work of responsibility, but we find one exception to this rule, and that applies to steam engineers. Machinists are generally employed by shop managers, who are themselves competent machinists, and are, therefore, ready to detect any lack of skill or ability in those hired to do work requiring the exercise of these qualities. Engineers, on the other hand, are in most cases employed by those who know little or nothing of the care and management of steam boilers and engines—those who have neither the time nor inclination to acquire such knowledge. In the almost universal application of steam to all kinds of industries it cannot be expected that steam users, as a class, will ever become well-informed in the technicalities of managing this mighty power. The weight of responsibility is usually fastened upon the engineer in charge, and if he is a man of skill, energy, and reliability it is well that it be so placed; but if he is careless or incompetent it is almost impossible to secure good results. If the effects of bad management extend no farther than waste of fuel and damage to engine and boiler they can be covered by extra drafts on the proprietor's pocket, and the public know nothing of the matter; but every day or two a brief account of some terrible boiler explosion and loss of lives appears among the news items in the morning papers. The fact is, but a limited percentage of those styled engineers deserve the title. The larger proportion of acting engineers never learned the trade, as it should be learned, before attempting the full management of an engine and boiler. They are not engineers in the proper meaning of the term, but coal shovelers. They have picked up just enough knowledge to keep an engine and boiler running.

Taking a superficial observation of the field, it appears that there are more arrant humbugs among so-called engineers, in proportion to the number in the trade, than in any other mechanical pursuit. The lack of particular information by employers doubtless gives rise to a great deal of false pretension. Men who have spent years of diligent working and studying to qualify themselves to be practical engineers, are daily thrust aside to employ ignorant, lazy and boastful coal shovelers at lower wages than a skilled engineer would accept. These men not only work for a low rate of pay, but are willing to leave their engine and boiler on call and perform sundry miscellaneous jobs, such as packing up goods for shipment, chipping castings, painting iron and wood-work, running errands, or making repairs to anything in the shop.

Employers are often much to blame for engaging a cheap incompetent class of men to run engines and boilers without regard to their fitness. They are too much inclined to regard wages as of the greatest consequence in deciding whom to employ. An engineer needs to read, study and advance himself in his business. The trade is a progressive one; new facts are daily being discovered in the employment of steam and adaptation of steam machinery and appliances. He who professes to be a steam engineer, and does not make an effort to keep informed as to new developments in his profession will find his usefulness growing beautifully less and his services valued accordingly. On the other hand, the unskilled coal shoveler, who applies himself to study and research to acquire a practical knowledge of steam engineering, will generally qualify himself for a steady position at good wages.

It is almost useless for competent engineers to try to educate the whole class of steam users, as to the danger and pecuniary loss involved by employing ignorant coal shovelers to manage boilers and engines. Some progress may be made with the earnest co-operation of the press, but the task will never be fully accomplished. Let them adopt the course of reading and improving themselves, and occasionally holding meetings for mutual advancement and protection, and the value of their skilled services will be more highly appreciated by intelligent men where called into requisition.

A New Form of Hay Fever.

In one of our Western towns, a new and surprising form of this disease has recently appeared, which, as watchful guardians of the machinery interest, it becomes our duty to chronicle.

Everybody who knows anything about this singular disease, which has hitherto been invariably confined to the human body, knows that it exhibits caprices in the manner and subjects of its attacks, and the methods of its cure, that are, to say the least, curiously instructive.

Those persons, who will insist that all mankind were born free and equal, seem to have omitted from their faith altogether, the fact, that this singular disease has never been known to attack any person possessing *less* than a certain average amount of income.

But, whether this omission is due to a desire to avoid the necessity of making their belief tally with the facts, is not a question necessary to be discussed here. Then, too, it is a matter of common observation, in many places, that so long as certain leaders of society remain quietly at their homes, even in the very height of the hay fever season, the disease does not venture to show itself anywhere in the town or neighborhood. Instances have even been known, in which a single individual, by simply staying at home all summer, has been able to assure the health of an entire community.

But it is to the larger towns and cities, that we must look for the greatest diversity of methods in quelling the ravages of this whimsical disease. In a small village, for instance, such an ingenious device as that so successfully tried in many large cities, viz.: locking the front door, putting up the front shutters, and making believe that the family are out of town for the season (the said family being all the time domesticated in the rear part of the house) never could be made to pan out returns, for reasons too obvious to require other than casual mention. Of all the sufferers by this midsummer malady, however, it is especially noticeable, that by far the worst cases known are those heads of families, who have sons whom they desire to see safely married to heiresses, or daughters whose chief aim in life is to subdue a merchant prince or foreign count. Next to these may, perhaps, be classed those interesting widows and widowers, who are beginning to dislike the sable signs of inextinguishable grief, and are thinking of choosing a new and living mate. Politicians, too, who find fulfillment of promises less easy than they deemed while making them, or who desire leisure for the successful laying of new wires, find hay fever a disease, for which summer travel and a sojourn at some fashionable resort are the only adequate remedies. Youths who part their names in the middle, also—but a classified *elite* directory hardly comes within the compass of this article.

Such being the characteristics of this oddest of all diseases, its latest freak is, without doubt, odder than all the rest. One of our Western exchanges contains details of the peculiar behavior of a second-hand engine and boiler recently bought from an opulent dealer in old junk, in one of our larger cities. They had been made as good as new, at least eight or ten times by the free application of putty, paint, and sealing-wax, but as the vender, who was very able-bodied, claimed them to be strictly second-hand, the outsider who would insinuate that the truth might lie in another direction, would be rash indeed.

However that may be, upon setting them up and attempting to make steam, it was found that wood and shavings were a snare,

"And stone-coal was in vain,"

the most vigorous fire that could be kindled with either of these materials having seemingly no other effect than to cause a faint wheezing, and a dribble of vapor around certain of the valves, suggesting to a shrewd observer, who was looking on, the idea that its behavior resembled that of a person afflicted with hay fever.

Acting promptly upon this hint, the enterprising purchaser immediately secured a large quantity of hay, chopped it up into square blocks and began feeding it in with a pitchfork, when, to the surprise of all present, the hitherto refractory machine began to hum in a most active manner, and since then has been at work every day without other fuel than hay, cut up in square blocks and forked in. Several times the experiment of substituting a less unusual fuel was tried, but had to be finally abandoned. But the worst feature of the whole case consists in the melancholy fact, that three and a half tons of hay daily, at a cost of $2.50 per ton, are required to keep this erratic engine and boiler going.

Of course such a singular occurrence has caused a continued buzz of curious speculation throughout the entire neighborhood, and many persons have expressed the belief that the new form of hay fever, from which this engine and boiler were most undeniably suffering, would eventually spread to other engines and boilers, and become epidemic among labor-saving machines throughout the country. As to the cause of this singular instance of disease, the most reasonable supposition that has yet been advanced, is, that when the cracks were puttied, waxed and painted the last time, either the opulent junk dealer who stood by to oversee the job, or the junior partner who actually did the work, was suffering from a prolonged and severe attack of that mysterious but aristocratic malady, the hay fever.

However that may prove, let us hope that watchful supervision and a rigid quarantine may avail to stay any severe or extended ravages of a new form of disease, which now threatens to become epidemic.

Kid Glove Naval Engineers.

At Annapolis, Md., is a Naval School for educating boys for positions as engineers in the United States Navy. It is said by the graduates that the boys are entered under competitive examination—political influence amounting to nothing, as all the competitors have an equal chance. They are supposed to be examined by a board of experts in engineering, and are required to pass a rigid examination. The first year they are said to be engaged in studying the rudiments of engineering, and practicing in the machine shops. They are expected to be sent on board a government vessel every Saturday, and there divided into regular watches, serving the required periods. During these periods they are supposed to be under the direction of one hundred and two competent officers of the U. S. Navy. Here, it is said, they are required to fire under the boilers, do their own work, alternating so that the cadets who fire one week will run the engine the next week. The second year they are expected to go into the machine shops two or three times a week,

in addition to their studies, and do all branches of work in order to test their skill and ability to superintend. The third year they are expected to work in the machine shops, boiler shops, and blacksmith shops, in all branches of the work. During this year they are said to disconnect and reconnect a large pair of marine engines. The fourth year they are said to work in the shop every day, and go out on steam vessels as assistants to officers, where they are to study the chemistry of boiler scale, coal, etc. During the last term they are said to be required to design and build a large marine engine in all its details. The course of study includes all branches of mathematics, naval architecture, applied mechanics, principles of mechanism, and steam engineering, both theoretical and practical. During the summer months the cadet engineers go on a trip along the coast, visiting all the principal steel works, machine shops, and manufacturing places worthy of notice, also government vessels. This has the name of being the best naval school in the world. So much for one side. Now let us glance at the other side, and see what is gained by this process, and whether good, first-class engineers are produced by this method.

The boys are admitted at the age of sixteen, and we would like to enquire: What boy could pass a very rigid examination at that age? It will be seen at a glance, that this rule debars the young man of riper years from entering the U. S. Navy as an engineer, though he may have acquired an education in some other institute equally as good. These boys are examined by officers in the U. S. Navy, who, with the exception of a very few, know no more than an ordinary school teacher. If the boys are to be admitted by competitive examination, then let the Board of Examination be composed of disinterested experts, who know how to examine boys for that capacity, and who will do so impartially. This would upset the present practice where A. B., a prominent citizen, has two or three sons, the oldest of which he thinks will make an engineer, the next a captain, and the next a surgeon, enters them for examination, and, under the patronage system, gets them admitted. Cases are on record, where not only whole families have been wedged into the service, but children raised particularly to fill these positions. The influence that a boy can control is a part, and the greater part, too, of the examination. For instance: A boy passes on his merits, but is told that there are too many from his State, consequently he is crowded out. Not long since, it was proposed to have a corps of cadet surgeons organized, which plan, very fortunately, fell through, as it was the most ridiculous monstrosity that ever appeared upon paper. It is useless to speculate upon this point.

Since these cadet engineers came into existence there has been a complete revolution in the navy. The students give much of their time to studying deviltry, consequently many of them get "bounced" when this is carried too far. Some of them with whom we are acquainted, have barely sufficient brains to run a shoemaker's bench.

The object in creating the position known as machinist in the navy was to crowd out the old engineers, or to abolish the engineer corps.

The intention was to carry two engineers on a ship, and these were to be assisted by the machinists while the cadet engineers stand by and see what is being done. While the positions for officers have been increased, and the capacity of their quarters, the space occupied by the men has been decreased, and at present they are sandwiched in between each other, in their hammocks, reminding one of "sardines in a box." If it were necessary for a man to get out of his hammock after he gets in for the night, it would be next to impossible for him to get back as the hooks to which the hammock is hung are only about 14 inches apart. While the positions of the officers have been made more easy, that of the men have been made harder. The original plan was to equip a frigate with one Chief Engineer and six assistants, divided into three watches, with two in each watch. These engineers invariably did their own work and repairs at sea, while the present order of things aims at the abolishment of this system, with no particular watches for the cadets, as the machinists take the place of assistant engineers. There is, however, this difference; they are not in the line of promotion, and they are called warrant officers, and rank with gunners and boatswains. They mess with the crew, sleep in hammocks, and are not in the way of the advancement of the cadet engineers. When this plan was first proposed, its principal advocate guaranteed to save, as was afterwards ascertained, more coal than was actually consumed in the whole navy. There is, in fact, no saving of fuel at all. The old engineers do not approve of receptions, balls and parties, at the government's expense, so they are crowded out and cadet engineers substituted, as such entertainments are just the thing to suit them. They do not work themselves, but hinder those who know how to work, hence are rightly called Government Paupers. In the old system, the engineers were all in the line of promotion, therefore were particularly interested in keeping the engine bright and neat, and none but skilled men were advanced to this position. The present state of affairs is far different. A frigate is provided with three engineers, four or five cadet engineers (or more if necessary), three machinists, one coppersmith, and one boilermaker.

The salaries of the cadet engineers are one thousand dollars per year; machinists, seventy-six dollars per month; coppersmiths and boilermakers, forty dollars per month. Suffice it to say that the difference of pay in favor of the old system would be sufficient to pay the expenses of running a merchant steamer. This is no exaggeration.

A ship belonging to the U. S. Navy, at the present time, comes into port with the valves rusted fast on their seats, and the whole engine looks like a pile of scrap iron. Instead of keeping the rods bright, they are left to rust and then painted. The keys and rod straps are all battered up by the use of a hard hammer. It costs the Government about five hundred dollars per year to educate each cadet engineer, and, considering the tuition of four years, with all the incidental expenses, it costs the snug little sum of three thousand dollars to produce each cadet engineer, which is sufficient to start a comfortable business.

A word about the manner in which they fill the position of engineers will not be amiss here. Suppose a ship receives orders to get under steam. The cadet engineers rush down to the machinist and say: "Jones, we have orders to get under way; so you will see that steam is raised and everything put in order." They then return to the deck. After steam has been raised, and just before they are ready to start, the cadets will again rush into the engine-room, and, when the signal is given, Jones starts the engine and runs it. One cadet says: "Well, Jones, I guess she is all right. Just see that everything works well, and, if anytning should happen, let me know." And away he goes on deck.

Pretty soon some others will rush into the engine room and say, "Jones, why don't she run faster," and when Jones remonstrates, saying that a greater speed would be dangerous, he is told to mind his own business. A number of ships have broken down at sea by reason of this management. If a brass railing which has been recently polished, happens to be in the engine room, they are sure to rub their hands over it a number of times, so as to spoil the polish (we saw them do it).

In reference to work they invariably say, "Oh, I am not agoing to work when I can live without it;" and instead of keeping their engine looking bright they will say, "I don't care; when it rusts, paint it:" and so they do, for connecting rods are often seen on U. S. ships painted on the top while they are solid rust on the bottom. A lot of these spoiled children will often dictate to an old engineer, who is so situated that he must touch his hat to them and say, yes, sir, and no, sir; when, if justice were done, he ought to apply his toe to their posteriors and set them up in the boot business.

If these cadets happen to touch any part of the engine and soil their hands, they immediately call Jones to hand them a piece of waste when it may not be two feet from them. Such a state of discipline is enough to make any rational man call for immediate reform.

As far as working in the shops is concerned, they simply botch around and keep other men from their work by asking unnecessary questions and excite a rebellious spirit towards the foreman, as they have no respect for that individual. In regard to the designing and building of a large engine the last year of their course, we would like some one to tell us where those large engines go to, and what ships have them on board.

There are no engines of any size built except such as the cadets choose to design and build for themselves, which are seldom, if ever, finished. The large engine said to be kept under steam, and occasionally taken apart and put together by them, is a pair of horizontal screw engines with cylinders 36" diameter, 30" stroke. They have a nice small shop, but no facilities for building large engines, so these are only built upon paper. It is true about the trips taken during the summer vacation, which are all at the Government expense. If this particular branch of cadet operations were explained in all its details, the public would learn of some fair specimens of hazing, deviltry and blackguarding, but these circumstances are, of course, kept quiet. This is said to be the best naval school in the world By whom? Why, by the graduates and cadets attending this school.

The old engineers are struggling to abolish the present and restore the old system by which the best engineers are secured, and a petition, requiring this reform, ought to be signed by all the honest citizens in the U. S. to whom it is presented and sent to Washington. The people who pay taxes ought to look into this matter more, and stop these leaks by which the public money is wasted, which ought to go towards the payment of the National debt.

We have received calls from the following out-of-town gentlemen, prominently connected with the machinery interest, within the last two or three weeks:

James W. See, Hamilton, Ohio.

C. F. Church, Hendey Machine Co., Wolcottville, Conn.

Wm. Maden, Cardenas, Cuba.

L. Sharpe, Treas. Brown & Sharpe Mf'g Co., Providence, R. I.

F. B. Miles, Machine Tool Works, Philadelphia.

W. L. Sweetland, Supt. E. Horton & Son Co., Windsor Locks, Conn.

E. Lyman, Chief Engineer Merrimack Mf'g Co., Lowell, Mass.

C. W. Le Count, South Norwalk, Conn.

S. H. Finch, Supt. of Shops D. L. & W. R. R.

The duty of legislators in the matter of accepting or rejecting free passes from railroads and transportation companies, generally, does not seem to be very forcibly insisted upon just at present. In the case of legislators (pledged by the obligations of their office to act as guardians of the public rights) the acceptance of favors of this kind from aggressive corporations, against whose encroachments the public have no other guaranty than the vigilant integrity of their legislative servants, would seem, from any high moral point of view, to be open to little question. Yet, in some of the States, this evil has grown to such enormous proportions that it has become a nuisance to the railroad corporations themselves, who see no point to be gained by the purchase of more votes than suffice to complete a good working majority.

If the tide of immigration into the country were not so strong, it might be desirable, as a matter of economy, for the great trunk lines, either to partition off a corner of each of their emigrant cars for the sole use of these super abundant dead-heads, or to fit up a box-car with benches, and attach it to some slow-going freight train. Doubtless, peripatetic statesmen, traveling on the former plan, would be exposed to some annoyance from fleas and other vermin, but the railroads would save something by the operation, while, if the box-car plan were adopted, the enforced leisure of extended trips made in this way might, at least, result in some slight benefit to the jack-knife interest, since everybody knows that the average legislator was born whittling. Some of them might even find time to reflect upon the beauties and benefits of the present Prison Labor Contract System, by which one active convict is so easily enabled to bring the noses of a dozen honest workmen down to the grindstone of squalor and starvation wages.

In the acceptance of transportation passes by journalists, a somewhat different series of questions are to be considered. It is certainly safe to premise that powerful corporations are, to say the least, very unlikely to give anything of value, where there is no hope of valuable return.

While the ideal end of journalistic duty, therefore, is, in a self-regulated way, to stand guard over the public interest, as well as to influence and shape the channels in which the public thought lives and moves and has its being, the question of accepting or rejecting such favors from corporations becomes an individual question for every individual journalist or journal to decide.

We are proud to be able to say that the AMERICAN MACHINIST has never asked nor accepted any favors of this kind, though such favors have been many times tendered, and are at all times obtainable. And what is more, it never intends either to ask or to accept them.

Business Specials.

Thirty cents a line for each insertion under this head.

The Huntoon Steam Governor Co., of Lawrence, Mass., warrant a direct saving in steam of from 10 to 20 per cent. over any other Governor known; while for quick and accurate regulation, great durability and lasting economy in use, they guarantee results never before attained by any other. See advertisement.

Brown & Sharpe M'f'g Co., Providence, R. I., keep in stock at reduced prices Patent Cutters for the teeth of gears which can be sharpened by grinding without changing their form. All wheels of same pitch cut with them will run together correctly. Send for new catalogue.

National Steam Pump, simple, reliable and durable. Send for illustrated catalogue with reduced price list. W. E. Kelly, New Brunswick, N. J.

Engine Lathes from 16 in. to 48 in. swing. Cuts Photographs and Prices furnished on application. A strictly first-class tool at a low figure. Geo. W. Fifield, Lowell, Mass., U. S. A., manufacturer.

Having an extensive acquaintance in Western Pennsylvania, and being located at Pittsburgh, Pa., I desire the agency of any manufactured article, machinery, machine tools or supplies. Address Responsible, care AMERICAN MACHINIST, 96 Fulton Street, New York.

Questions and Answers.

Under this head we propose to answer questions sent us, pertaining to our specialty, correctly and according to common sense methods.

(1) W.H.S. Graniteville, S.C., writes: Will you answer through the columns of your valuable paper: 1. Why a lathe for turning metals is called an engine lathe, and when it was first called by that name? Also give the names of the different turning lathes. 2. I have some steel called R. Mushet's special steel which I am unable to work. Please answer and oblige. A. 1. It is very difficult to determine at what particular time the turning lathe was called an engine lathe, as the lathe is a very ancient invention, and believed to have originated with the potter's wheel, which consists of a disc or table rotating in a horizontal plane, with a vertical shaft, used only with plastic material, and is as ancient as the oldest Egyptian monuments in which the god Ptah is represented holding a man upon the throwing wheel. The turning lathe proper was unknown to the ancient Egyptians but was mentioned by the Greek writers some centuries before our era, and was employed on wood. It's use for turning metal is of comparative recent origin. The credit of this invention is given by Diodorus Siculus to Talus, the grandson of Daedalus, about 1240 B. C., and by Pliny to Theodorus of Samos. The first hand screw cutting lathe is described in the

work of Jacques Besson, published at Lyons, France, in the year 1578, which would cut right or left hand threads of any required pitch by means of different sized pulleys placed upon the end of screw and driven by belts. The first lathe for turning metals is described in Mechanick Exercises, by Joseph Moxon, hydrographer to Charles II, printed in London in the year 1694. However, there are evidences of earlier origin. The turning lathe has undergone many modifications and improvements, and there are now over one hundred and sixteen different classes of lathes. An engine lathe is designated as one for turning metal with an automatic feed. For a record of the inventions pertaining to the lathe, see a book entitled "The Lathe and its Uses," or instructions in the art of turning wood, and metal. 2. Full directions were given for the treatment of R. Mushet's steel in our issue of July 26th, 1879, answer to question 4.

(2) A. P., Philadelphia, Pa., writes: Would you be so kind as to inform me how I can find the inside radius of a cylinder? For instance, what is the internal radius of a cylinder 30 in. diameter? Oblige very respectfully a machinist's apprentice. A. We would advise the young man asking the above question to study his arithmetic a little more before asking such a question. We are always glad to give information and receive as well, but dislike to spend our time on such simple commonplace questions, which any one ought to be able to answer. The radius of a circle is equal to half the diameter.

(3) A. B., Barbaboo, Wis., writes: Would you oblige a subscriber of your valued paper, by informing him through the columns of your paper of the best way of hardening tools for turning or planing very hard cast iron? Would not a preparation such as used for tempering mill picks do? And can you name any such preparation? 2d. I would beg you to give a receipt for a cement to fill holes in finished castings that will stay and not be noticed much A. The formula for a very good solution is contained in questions and answers in our issue of November, 1878. Very much depends upon the shape of the tool, and speed. 2. We are aware of the existence of no cement that will do what you require, and we believe the only way that a hole can be stopped so as to leave no trace is to fit a plug made of the same kind of iron as the casting. All cements for the purpose of stopping holes in castings will show an unfinished work.

(4) J. F. B., Catskill, N. Y., writes: I am making a coil boiler of ½ inch steam pipe, and 129 feet in length. Will it furnish sufficient steam for a 4' x4" cylinder? The engine is to make 200 revolutions per minute. If not, how much more pipe will I need? Can I make such a boiler without infringement? Please answer through your query columns. A. It would be preferable for you to send us a sketch, with dimensions of the boiler which you intend to use, as we cannot give you an intelligent answer from the data contained in your letter. There are so many different kinds of tubulous boilers, that differ very materially from each other in economy and efficiency that you will no doubt see the necessity of these requirements.

(5) F. S. P., Elizabeth, N. J., writes: As one of your subscribers, will you please set me right on the proper amount of lead for locomotive valves? Also in what proportion the lead is to the inside lap? I have been led all astray by the book, "Useful Companion and Artificer's Assistant." On page 577, under heading of "Lead on the Slide Valve," at the bottom of the page, the author says one-eighth of an inch for freight engines, and one-sixteenth of an inch for passenger engines, is sufficient lead. Now on page 588 the author says, "A majority of railways allow for lead, in full gear, on express passenger engines, and express accommodation engines one-tenth of an inch, while for heavy freight they allow one-sixteenth of an inch." Here the author contradicts himself, for on page 577 he says the lesser amount of lead is for the faster work (which I think is correct), and on page 588 it is exactly the reverse. Apologizing for taking up so much of your time, but wishing to be set right. (2) Will you be kind enough to tell me of some good work on locomotive engineering. A. There are a great many different ideas in regard to the lead and inside lap of locomotive slide valves. The best results have been obtained from valves cut line and line inside for fast running engines. For suggestions in regard to lead and practical working see, "Practical Method of Setting the Valves of a Locomotive," by L. F. Lyne, in our issue of November, 1878. The errors mentioned by you, as occurring in the Useful Companion, are not such in reality, as we are aware of both systems being used, and in some cases one-eighth of an inch was used. (2) We believe the "Catechism of the Locomotive," by M. N. Forney, to be a good plain book on this subject, for the use of the practical man.

MANUFACTURES.

The Chicago and North Western Railway are building an addition to their round-house at Baraboo, Wis., of 17 stalls, making 25 in all. They are also building new machine and blacksmith shops, 77×220 feet, the whole in one building, to be heated by steam. The machine shop has three erecting pits. The number of tools that will be required is not known at present, nor the number of men that will be employed when the shops are completed.

E. P. Bullard, 14 Dey St., New York, is making numerous sales of new and second-hand machinery to Cuba, as well as to all parts of the United States. He lately sold a 28″×60″ Corliss engine to go to St. Louis.

At a meeting of furniture-workers, held at Chicago, lately, Messrs. Stahiknect, Allen, Hinsseling, Christianson, Rasmussen, Ruleau and Beaudry were appointed a committee to take steps toward organizing the new co-operative furniture establishments, for which over 1,000 shares have already been sold.

Watkins & Keeler, a new firm from Pittsburgh, Penn., will soon erect a large boiler manufactory at Chicago.

The Furst & Bradley Manufacturing Company are building an extension to their works at Chicago.

A stock company for the manufacture of a new piano is being formed in Chicago.

The Central Railroad of New Jersey has ordered 5,000 new cars, consisting of box, flat, gondola and coal cars. The company is also having its old cars re-numbered.

Gaff, Fleischmann & Co., Buffalo, N. Y., are re-setting their boilers with the Jarvis Patent Furnace, to burn the wet mash and other waste.

The brush factory of Napanee, Canada, is about to go into operation.

Whiteley, Fassler & Kelly are to erect a large mower and reaper factory at Springfield. It will have an area of flooring, sixty feet wide and more than a mile in length, and will have a capacity for the working of over 600 men.

The Hunt Street Bedstead Company, of Cincinnati, are erecting a new factory to be ready for occupancy in October.

Milwaukee is to have an important addition to her manufacturing interests in the establishment there of the barb wire factory of Ross & Nutting, formerly located at Chicago, Ill. The Berlin Coffin factory is also to be removed to Milwaukee.

The Speed Recorder Company have decided to build new shops at Kent, Pa., at a cost of about $6,000.

The Kalamazoo Paper Co., Kalamazoo, Mich., are putting in two steel boilers, made by D. F. Dillon, of Fitchburg, Mass. They will be set with the Jarvis Furnace, and Mahony Patent Grates, to burn cheap fuel.

A co-operative laundry company has been formed in London, England, with a capital of $250,000.

John Wallace, whose mill at Leota, Kan., was recently washed out by the flood, is rebuilding at Modell.

The city of Omaha, Neb., is just now agitated over the subject of water-works, and the council and citizens of that place have been considering which is the best system for them to adopt.

St. Louis, Gratiot County, Mich., is to have water-works, for purposes of fire-protection, upon the Holly system. The town will be bonded to pay the expense thereof.

C. C. Crane has just begun the foundation for another marseilles spread mill at Housatonic. It will be one story in height and will contain 24 looms.

Davis Brothers are rebuilding their Kearsarge Mill at Contoocook, N. H.

The American Shade Roller Company contemplate building a factory at Watertown, to be 175 by 50 feet, and four stories in height, which will furnish employment to some fifty or seventy-five hands. The company now manufacture their goods in three separate locations in Boston, and the proposed change is in order to bring the business under one roof.

The Celluloid Manufacturing Company, Newark, N. J., has sunk an artesian well, 350 feet deep, which furnishes 500 gallons of water per minute.

Newell Brothers' new three-story factory at Springfield, Mass., will soon be ready for occupancy. The first and second floors will be used for the button business, and the third story will be occupied for their paper-box making.

Charles A. Baldwin & Co., corset manufacturers of New Haven, have voluntarily increased the pay of their hands from 10 to 33 per cent.

Burrough & Pierson have commenced to rebuild their flouring and grist mills at Flint, Mich., which were recently destroyed by fire.

The Lewiston, Me., Machine Company has one hundred and fifty men at work, and is driven with orders. The agent finds it difficult to obtain a sufficient number of skilled workmen.

Klein, Logan & Co., of Pittsburgh, have lately started additional machinery for rolling mattock and pick eyes. One machine is capable of producing one thousand eyes per day.

Bliss & Williams, Brooklyn, inform us that the industrial depression in England tends rather to improve their foreign business than otherwise, as the British manufacturers have got to the point where they can see no other way out of their difficulties than the wholesale adoption of American tools. This firm are also shipping a great deal of metal-working machinery to Australia.

The tin-ware manufacturers are crowded with orders everywhere. An important item in this trade, now-a-days, is the packing of cooked meats in tin cans in immense quantities, principally for shipment abroad. Vast as this trade is, it is growing steadily.

The Manchester Locomotive Works are quite busy on orders for locomotives and steam fire engines. They have recently sent new steam fire engines to Randolph, Mass., and to Brockton, Mass., and new hose carriages to Randolph and Lowell, Mass., and are building more for the latter city.

It is stated that there is to be a tack factory started in Bowenville, Mass.

A company with a capital of $75,000 has been formed at Mechanicsville, N. Y., to operate a mill in that village.

The Boston and Albany machine shops are turning out twelve locomotives, escape valve mufflers, daily.

The employes in the machine shops of the Baltimore & Ohio Railroad, at all the principal stations have been put on full time.

John M. Munn, of Northampton, is to remove his foundry business from that place to Holyoke, Mass.

A company of beet-sugar manufacturers in Germany have offered to come to Baltimore, Md., and provide all the capital required for the establishment of a beet-sugar factory, and bring over machinery of the latest inventions, which, it is claimed, will extract every particle of saccharine juice from the beet. They also agree to bring skilled workmen to run the factory.

The shops of the Holyoke Machine Company have been equipped throughout with new machinery of the very best description, within the past year. The company is sending large shipments of machinery abroad, filling orders from England, France and Russia.

The Chicago Tack Company, at Grand Crossings are running on extra time, and are constructing new machinery as fast as possible, to enable them to keep pace with their growing trade.

McIntosh, Hemphill & Co., Limited, of Pittsburgh, are engaged in the manufacture of steam hammers, they having recently completed a 4-ton steam hammer for the Keystone Bridge Co., of Pittsburgh. They are now making a 2500 pound hammer for the same firm.

Rowley & Hermance, Williamsport, Pa., manufacturers of wood-working machinery, are running the largest establishment of the place. On account of the rapid increase in their business, it has become necessary to build, and they are now erecting an extensive addition to their works. These works were built in 1850. The merits of the various machines made by them are not only recognized at home, but they have recently made several shipments to England and Australia. They are now running 13 hours a day to fill orders.

Innis & Plympton, engine manufacturers, of Oil City, have shipped three of their improved engines to Russia. They were made with improvements to suit the work in the Russian oil fields.

It is said that the Chase Machine Company do not seem to meet with much success in their attempt to compromise with their creditors at 10 cents on the dollar. Considerable trouble exists in regard to a claim of $470, held by the firm who are their creditors for rent and power, in regard to the sub-letting of the premises. The company have presented no statement of their financial condition to their creditors, and the latter, it appears, know nothing in regard to the liabilities and assests.—*Boston Com'l Bulletin.*

Engineers' and Machinists' Supplies.

Trade is brisk and the upward movement still continues on the basis of a good business and everybody happy.

Now-a-days persistent or notorious "shoppers" on prices get very little encouragement in their efforts to beat down prices. The telephone is made to play quite an important part in upholding prices, for the moment a "shopper" leaves one dealer, the announcement is immediately shouted through the telephone, "So-and-so is coming—make it warm for him," and if So-and-so, on his arrival, is not incontinently fired out, he, at least, begins to realize that the days of selling goods for the mere pleasure of doing business are ended.

The change in prices of nuts and bolts, which we noticed in advance in our issue of July 26th, is now well before the public. Large bolts, up to twenty inches, will hereafter be sold by the piece instead of by the pound. The entire list has been revised, amounting to an advance ranging from 5 per cent., upwards. On a few sizes the advance is from twenty to twenty-five per cent.

Morgan & Herrick, 86 John st., N. Y., are preparing to issue a new and complete illustrated catalogue of machinists', engineers', mining, steamship, and railroad supplies. The book will be bound in stiff covers, containing some hundreds of pages, and will be ready Sept. 15th.

The Morse Twist Drill Company are introducing a new Twist Drill Grinder, for which especial advantages are claimed.

H. S. Manning & Co., 111 Liberty Street, N. Y., have taken the local agency for the new system of re-sharpening old files by the sand-blast, instead of the old method of re-cutting. It is claimed that by this plan files can be re-sharpened four or five times before needing to be recut, and at small cost.

Frasse & Co., 62 Chatham St., New York, in response to a demand that has existed several months have secured a complete stock of tempered steel wire and brass wire springs, in assorted sizes for machinists and model makers. They sell uniformly at 5 cents each.

In boiler makers' supplies trade is booming, the dealers finding it impossible to supply all their orders.

The Standard Oil Co. are building large oil tanks at Bayonne, N. J., for which several hundred tons of tank iron are required.

Prices are tending upward and there will doubtless be an early advance.

A. B. Warner & Son, 28 West St., N. Y., report the following rates out of store: Tank iron, 3c. per lb., C. No. 1, 3¼c; C. H. No. 1 shell, 3½c.; best flange, 4½c.; Eureka flange, 5½c.; tubes, 52½ per cent. discount; sheet iron, 3c.; angle iron, 2 6-10c.; Rivets 3¾ cents per lb.

Situation Wanted—Help Wanted.

We will publish notices suitable for the above headings, applying to any of the machinery trades, and not to exceed four lines each (32 words), at the nominal rate of twenty-five cents for each insertion.

WANTED.

First-class Boiler Maker wishes a situation. Competent to take charge of any kind of Boiler or Bridge work. Address, J. Whitty, Paterson, N. J.

WANTED.—A first-class Moulder for a jobbing shop. Steady employment to a sober, competent man. Address, with references, F. D. Livermore, Rochester Minnesota.

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Vise File Holders.
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Safe, Durable and reasonable in price.

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We manufacture the "Giant Friction Clutch Pulley," known as the "Captain." Is the **Best in the World** for connecting the gearing of callender rolls, hoisting coal, logs or freight. Our Clutch can connect any amount of power, at any speed, without slacking the motive power in the least, and gives no shock, is easy to ship and unship, in *fact* this is the only Clutch that can do heavy work satisfactorily. Can be seen with power applied at 95 and 97 Liberty Street, N. Y.

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The Best Solid Wheel in use. Will not Glaze, Heat, nor smell, and will run equally well, Wet or Dry.

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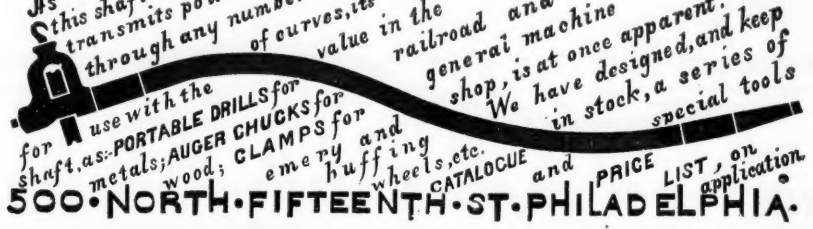
As this shaft transmits power through any number of curves, its value in the railroad and general machine shop, is at once apparent. We have designed, and keep in stock, a series of special tools for use with the shaft, as:- PORTABLE DRILLS for metals; AUGER CHUCKS for wood; CLAMPS for emery and buffing wheels, etc.
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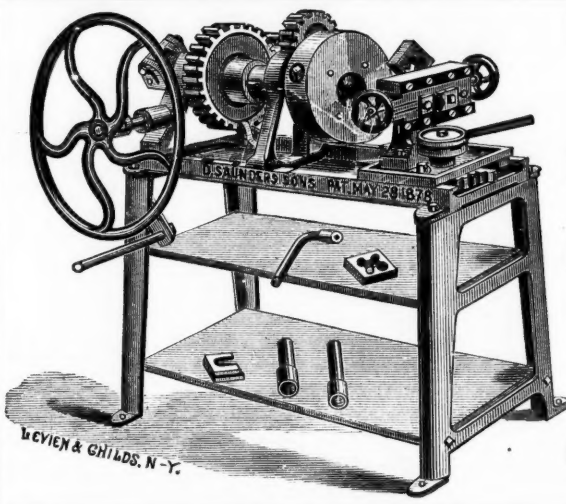

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A SPECIALTY.

Send for Circular, and say where you saw this advertisement.

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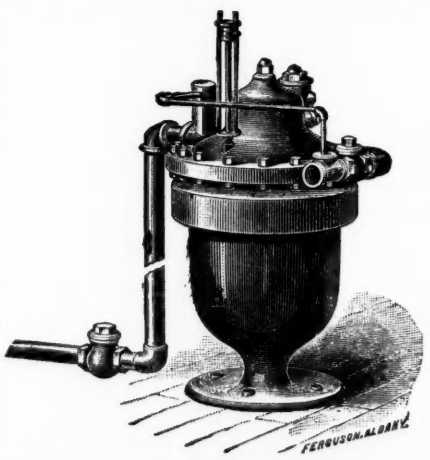

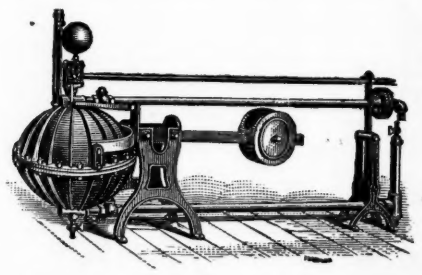

This Trap automatically drains the water of condensation from HEATING COILS, and returns the same to the Boiler, whether the coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes.

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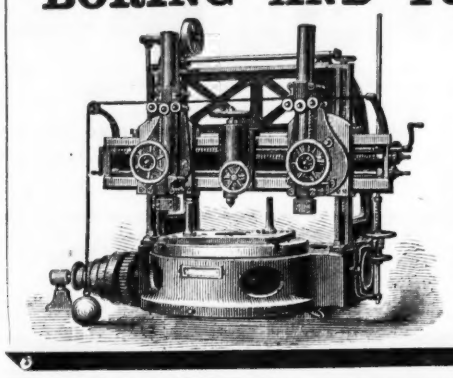

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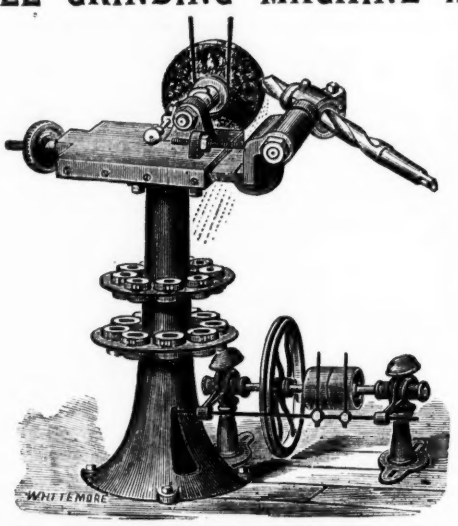

This Machine grinds drills to the same shape as the best machinists do by hand. It enables the operator to make the cutting edge or lip of the drill thick and strong so it will not crumble away in drilling, also to make the lip true with the twist or outside surface

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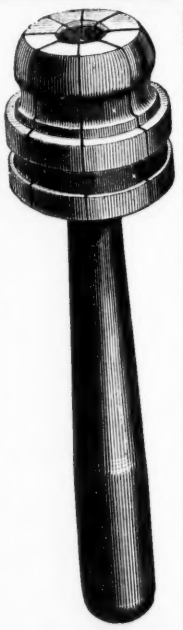

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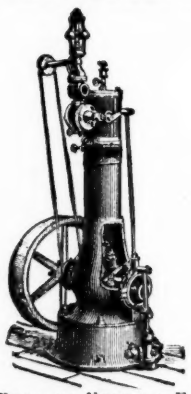

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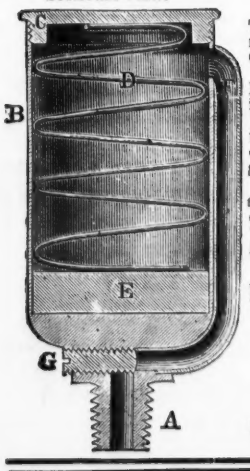

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Saves Oil, Belting, Machinery, Time, soiling of Fabrics, &c., &c. Will run from one to three months with once filling. Gives general satisfaction.

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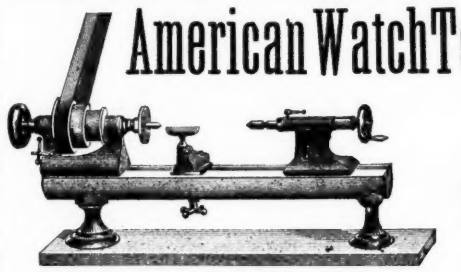

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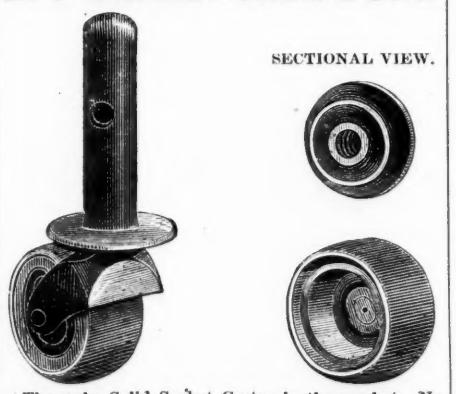

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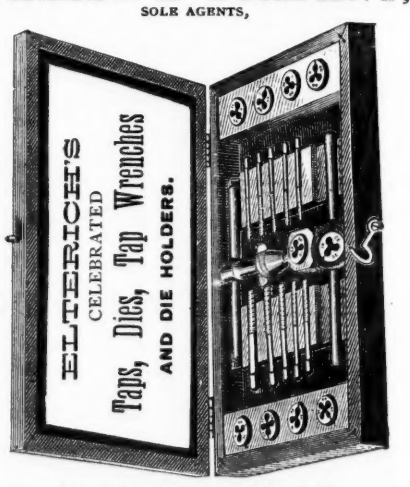

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WEEKLY REVIEW.

NEW YORK, AUGUST 15TH, 1879.

The advance in Bar, Bundle, and Sheet Iron, which we anticipated in our last review, has taken place, as will be seen by our quotations below, and in our opinion the advance will certainly be maintained, and probably continue for some time to come; the mills have their order books filled for some time ahead, and they will not make a quotation for early delivery at any price, and seem unwilling to make prices for future delivery except at a large advance in prices.

The rates out of store are now as below: No. 1X Pig Iron $19.50 per ton; Iron Rails, $42.00 to $44.00 per ton, according to weight; Old Rails, $25.00 to $26.00 per ton; Fish Plates, $2\frac{2}{10}$c. per lb.; Railway Spikes, $2\frac{3}{4}$c. per lb.; Bolts and Nuts, $3\frac{1}{2}$c.; Common Iron, $2\frac{1}{10}$c. basis from store; Refined, $2\frac{3}{10}$c. basis; Ulster, $3\frac{1}{2}$c. basis; Machinery Steel, 5c.; Best Tool Steel, 12c.; Norway Bar Iron, $4\frac{3}{4}$c.; Norway Shapes, $5\frac{1}{4}$c.; Nail Rods, $5\frac{1}{2}$c.; Sheet Iron, $2\frac{8}{10}$c.; Angle Iron, $2\frac{6}{10}$c.; Tee Iron, 3c.; Band Iron, $2\frac{6}{10}$c.; Hoop, $2\frac{8}{10}$c., up; Horse Shoe, $3\frac{2}{10}$c.; Tank, $2\frac{7}{10}$c.; C No. 1, 3c.; C H, No. 1 Shell, $3\frac{1}{4}$c.; Best Flange, $4\frac{3}{4}$c.; Boiler Rivets, $3\frac{1}{2}$c. per lb. Hot Polished Shafting in lengths two feet and longer, from 5c to 6c. per lb., according to size. Small Black Rivets, 50% off in papers, 35% off in bulk.

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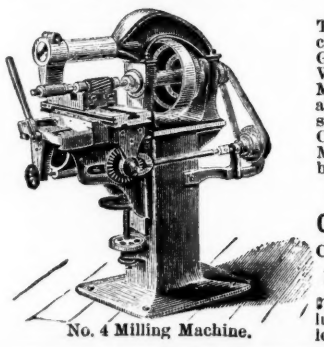
Manufacturers of

Milling Machines, Drill Presses,



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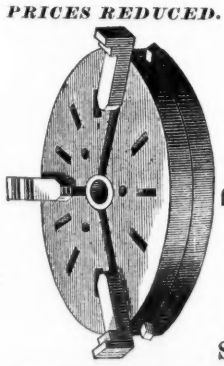

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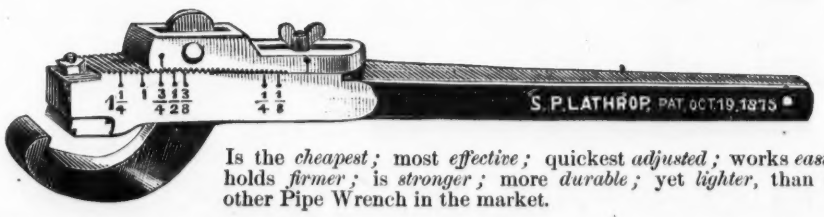

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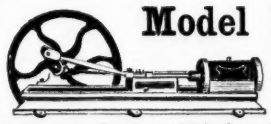

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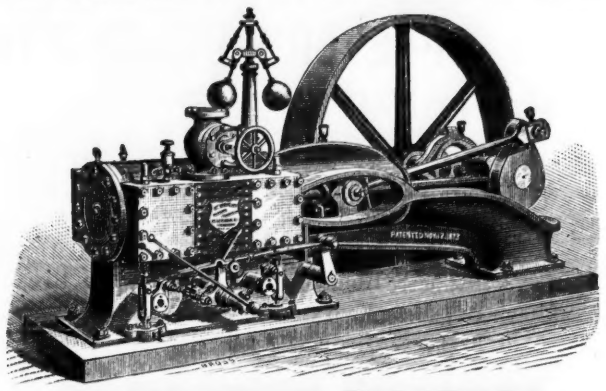

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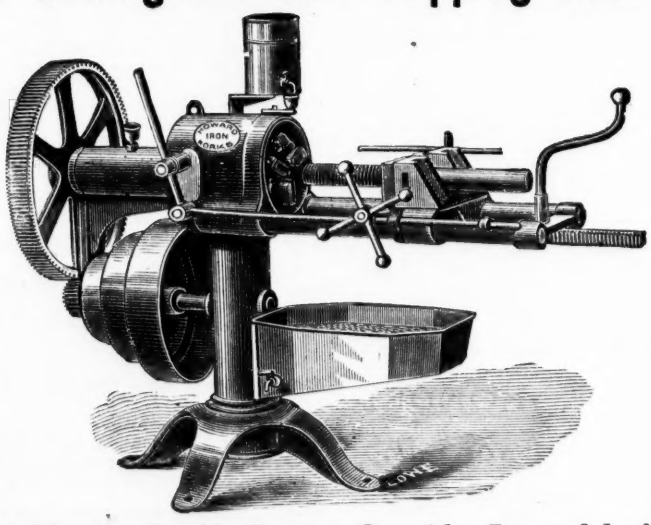

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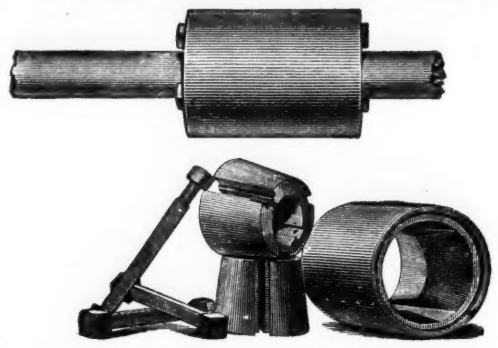

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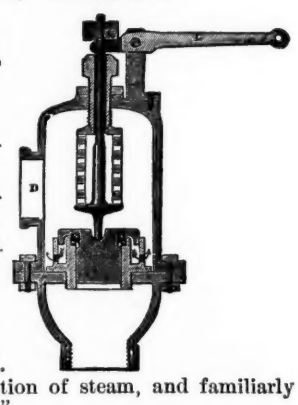

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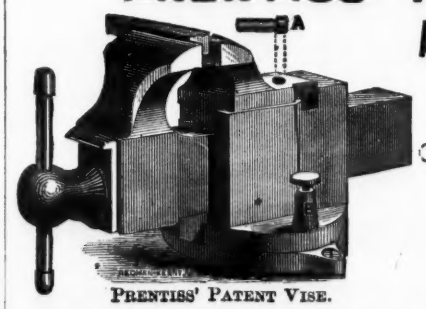

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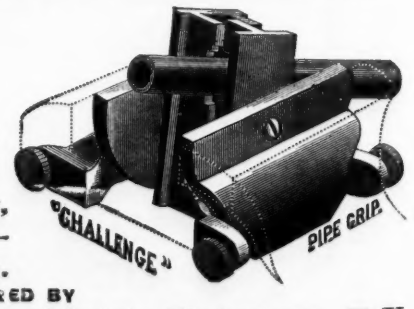

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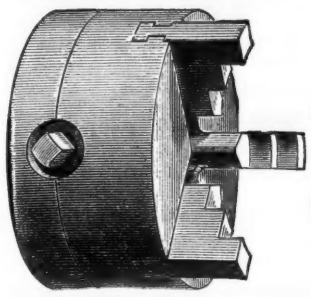

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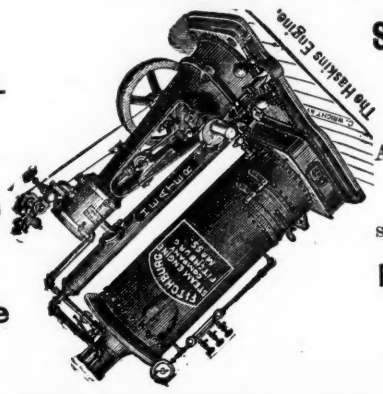

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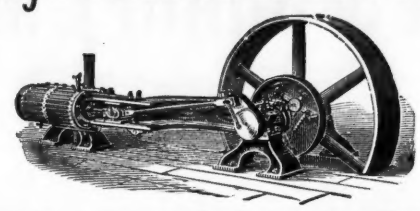

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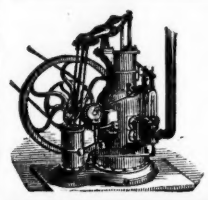

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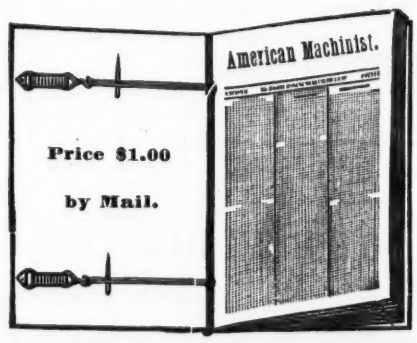

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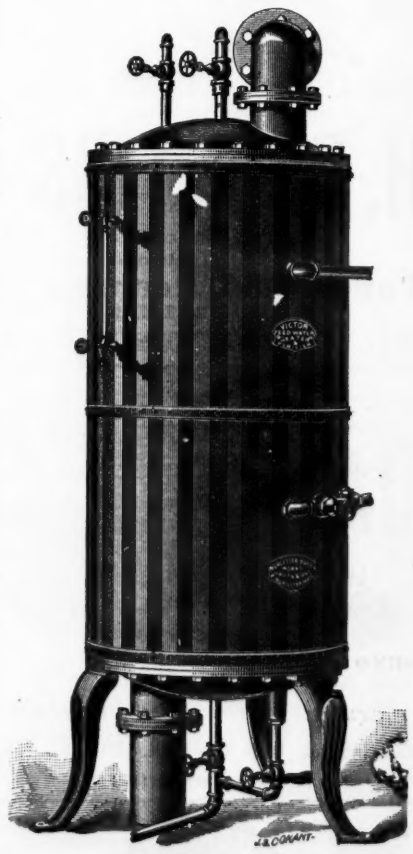

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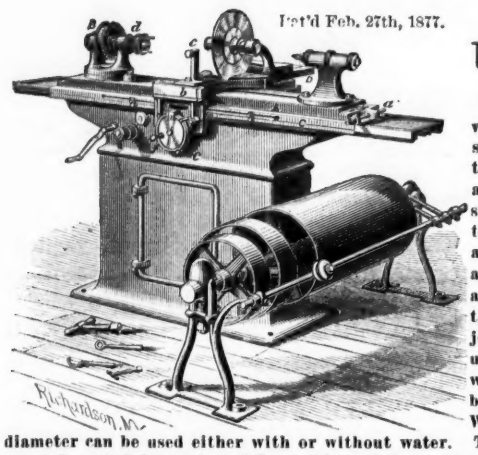

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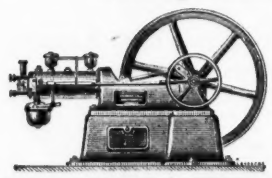

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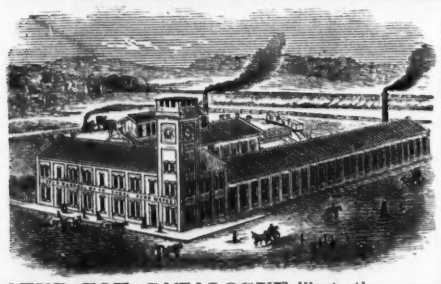

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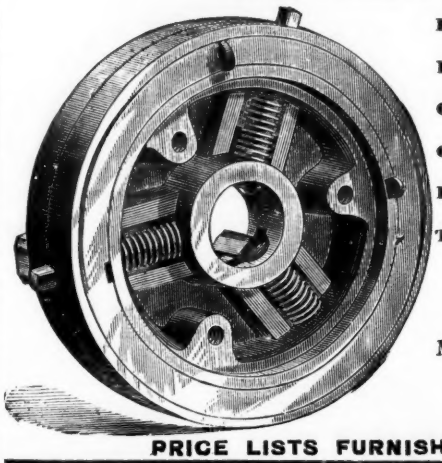

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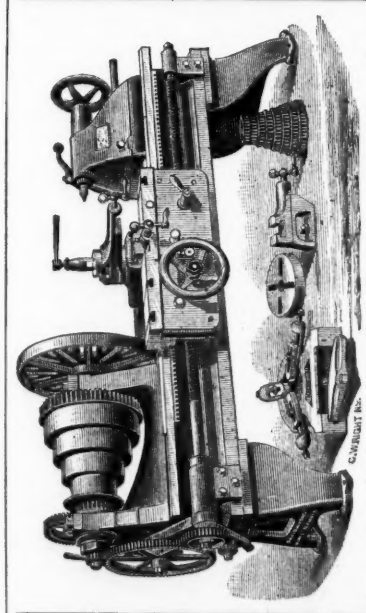

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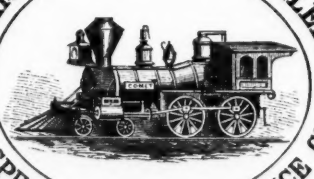

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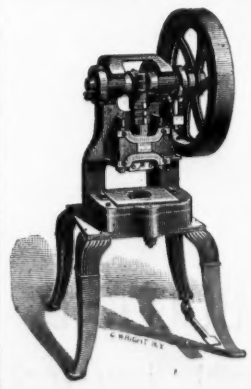

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